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THE GRID

SCOTT PARKER EDITOR

WHAT'S YOUR STYLE?

There certainly is no shortage of ways you can build your Corvette. For the earlier generations such as the C1, C2, and C3 there seem to be more designated "styles" if you will. Some of these include restoration, restomod, Pro Touring, and Pro Street. The latter was more popular in the 1980s, and was known for the huge rear tires tucked under the quarter-panels (accommodated by wheeltubs) and wheelie bars. A big-block with a blower or turbo was the norm, along with a rollcage, but still a full interior, wipers, lights, etc. It was basically like a big-tire drag car you could drive on the street. Some of these builds have made a comeback to some extent, albeit with more modern elements like larger diameter wheels as influenced by the more recent styles such as restomod and Pro Touring.

If you are not familiar with the term restomod, I'm sure you are more than used to seeing them on the pages of *Vette* and other magazines. A restomod features a restored original appearance but modern technology when it comes to performance, safety, and comfort – hence "resto" and "mod." For example, a restomod '71 Corvette might feature a Vintage Air system, Corbeau seats, C6 Z06 wheels and brakes, Chevrolet Performance LT1 engine, and Tremec Magnum six-speed manual. The focus is on building a car that is functionally like a modern vehicle yet retains those classic lines.

Contrary to popular belief, a restoration is not necessarily any cheaper than a restomod. Deals can be had on wrecked vehicles to acquire modern powertrains and other parts. Meanwhile, acquiring a period-correct molding or trim piece can be a daunting and expensive process. Using factory or N.O.S. parts to restore a rare car could easily run you a pretty penny – even worse if you are employing a body shop to rework certain parts that cannot be found. If you are after a coveted NCRS or other designation, you'll be putting even more time into the intricate details like emblems and overspray to make sure it looks just like it rolled off the assembly line.

Pro Touring is turning into a sort of no-holds-barred style of car building. GM engineer Mark Stielow (as well as legendary scribe Jeff Smith) coined the term, who went to great lengths to ensure his first-gen Camaros would outperform modern sports cars. His last few iterations borrowed an LS9 powerplant and even ABS as well as all the creature comforts and styling to win acclaim and SEMA awards. You may be wondering what the difference is between restomod and Pro Touring … The answer is clear as day when you look through the clear Lexan window in Stielow's hood. Despite the costs involved with building some of these all-out custom cars, the common theme among all Pro Touring vehicles is that they were built to be driven. Not to sit in the garage. I've had the pleasure of speaking with Brian Hobaugh, who used a somewhat different but impressively effective recipe to build his '65 Corvette. I've long been a silent admirer of Brian and his '65, first and foremost because he drives the tires off it. But despite the big wheels, big brakes, and heavily massaged fenders, the soul of the '65 is very much intact.

As Steven mentioned in his farewell editorial, I love to drive my cars and drive them hard. Not that I don't appreciate the super rare and low-mile Corvettes fit for a museum, but if there's one thing I've learned from having a 5-year build of a drag car it's that there is a limit to how much you can love something that you just look at. I daily drove my ProCharged C6, and would bolt the drag radials on once or twice a month and head to Bradenton Motorsports Park – to say nothing of the laps I made prior to the blower at Gainesville Raceway's road course. I had more fun in 6 months of running low-11s driving to and from the track than I've had over the course of 5 years with the hope and promise of running 8s. With so many fun events where you can make friends with your fellow Vette lovers, I'd like to encourage you to dust off your Corvette and get out there. That's where my staff and I will be. Hope to see you there! **VETTE**

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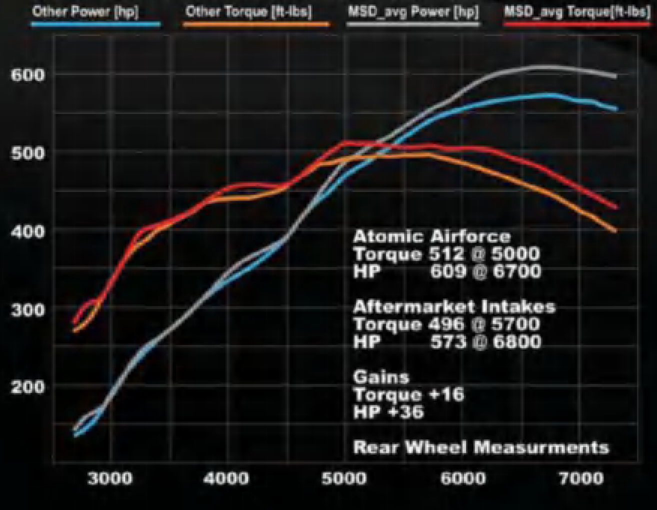

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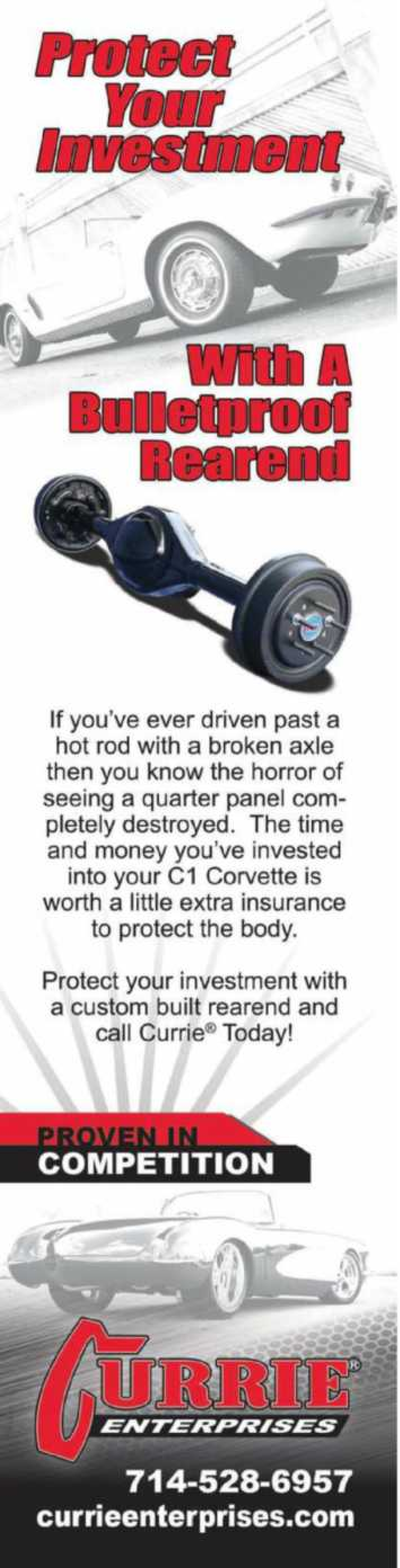

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FROM THE ARCHIVES

FLAT-OUT FOLLIES, 1984

Score one for the home team.

In the spring of 1984, *Motor Trend* took a handful of the highest performing sports cars available in America to the Transportation Research Center in Ohio to determine which one deserved the title of the "Fastest Car in America." The Center's 7.5-mile oval, with banked corners steeper than Daytona's and nearly 2-mile-long straightaways, would allow the cars to run flat-out for long enough to measure their peak velocity.

Nearly every car represented some form of European exotica: a Ferrari 308GTBi Quattrovalvole, Lotus Esprit Turbo, and no fewer than three Porsches—a 928S and two 911 Carreras, as the German factory wasn't sure if the Turbo Look or standard Carrera would be faster.

Thrown into that mix was a lone American entry: a Corvette, described by author Ron Grable in the magazine's July 1984 issue as "in the up-power, port-injected form about to be in production." Recall that, when the C4 was introduced for the 1984 model year, it was powered by the Cross-Fire-injected, 205hp 350 that carried over from the '82 model year. Tuned Port Injection, and its 25 additional hp, didn't show up until the '85 model year.

Grable was surprisingly candid about the staff's expectations for the Vette. "When we began this test, the Corvette was perceived as, 'Ya know, the big American car, heavy iron V-8, fiberglass, big hugga-mugga tires, disco-dash. This test is for sophisticated, established, Euroflash stuff. Autobahn burners, Autostrada flashes. No new kids allowed. No chance, Corvette.'"

Well, the radar gun had no such preconceptions. Final score: Corvette, 155.2 mph. Euroflash, zero.

OK, not exactly zero. The Lotus was closest at 152 (before it holed a piston), the Ferrari at 151.3. None of the Porsches cracked 150.

"What was this fiberglass rocket like at almost three times the legal limit?" asked Grable. "As stable as your living room couch, and as comfortable. No drama whatsoever to report. On the cool-off lap we even tried driving up and down the banking, still at speed, and the transitions from flat to bank were linear and predictable."

While at TRC, the staff also put the cars through acceleration and braking tests. The Carrera proved quickest of the bunch, at 5.51 seconds to 60 and 14.04 in the quarter. The Vette wasn't far behind: 6.08 to 60 and 14.50 in the quarter. The Vette did stop in the shortest distance—126 feet from 60 mph—thanks in no small part to its "hugga-mugga" Gatorbacks.

After admitting to his pre-test bias, Grable closed his story acknowledging that the Vette "is the fastest and stops better than the rest. That makes the Chevrolet Corvette the standard against which the others are measured. Can there be anyone not yet convinced? And by the way, isn't it great that it's finally an American car on top of the heap?" **VETTE**

BY **DREW HARDIN**
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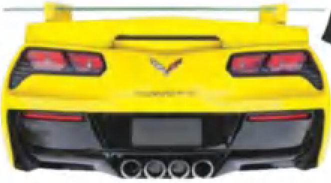

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DOUBLE TROUBLE

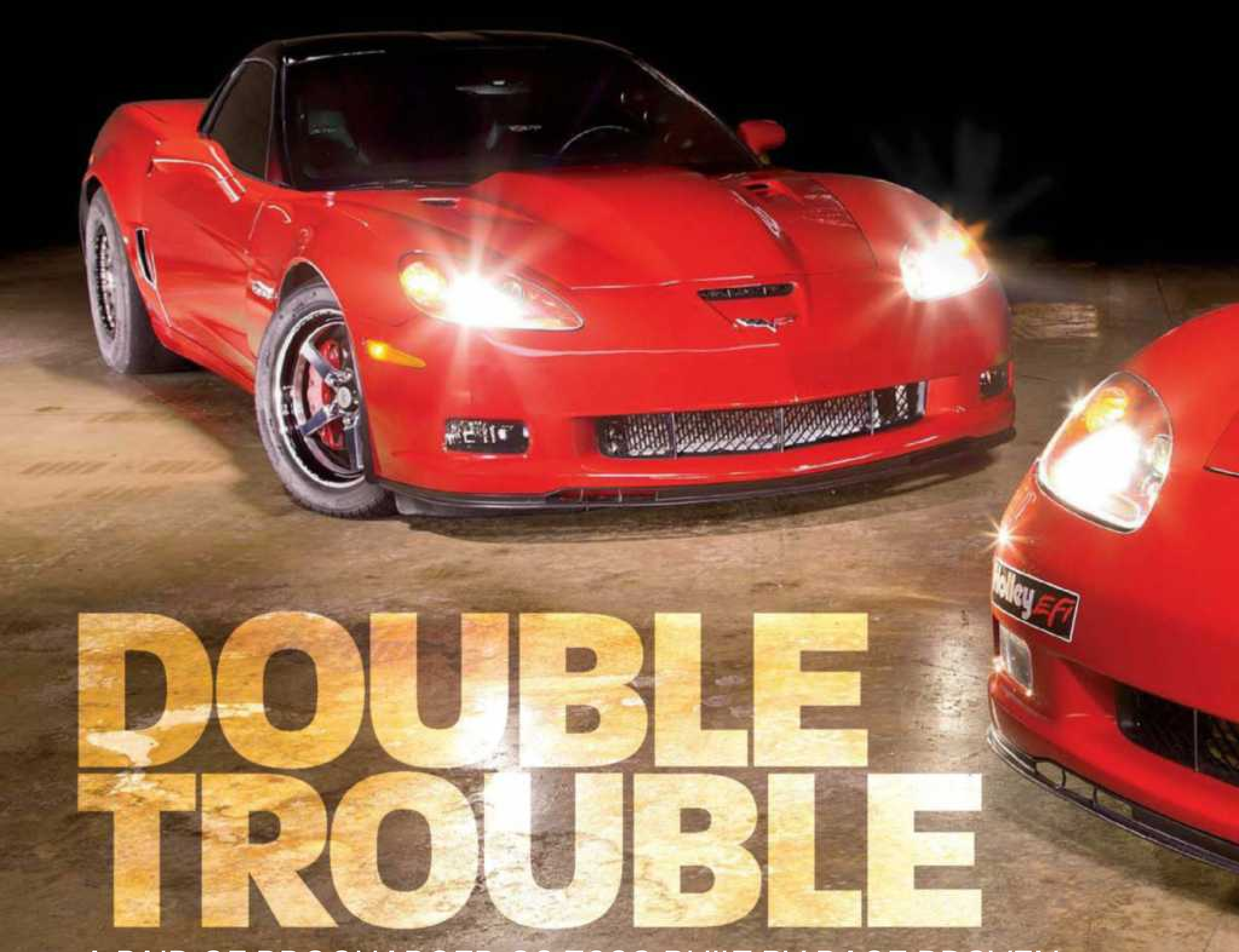
A PAIR OF PROCHARGED C6 Z06S BUILT BY RACE PROVEN MOTORSPORTS – ONE FOR THE STREET, ONE FOR THE TRACK

BY **SCOTT PARKER**
PHOTOGRAPHY BY **JOHN MACHAQUEIRO**

I'm beginning to wonder if Race Proven Motorsports builds anything that isn't a red C6 Z06. But you can hardly blame someone for wanting a street-going twin to Race Proven's 7-second shop car, the very same one that first broke the 8-second barrier. Both, though, are now a far cry from the comparatively docile 2007 Corvette Z06 that ran 8.80s on pump gas. The New Castle, Delaware-based shop continues to push the envelope of the Corvette platform, hurting feelings one pass at a time.

Starting with the shop car, Race Proven's President Fran Schatz has had a long and colorful history with the record-setting '07 Z06. What began as a customer car became Fran's pet project, and amidst its transformation from a street car to a dedicated drag car it was actually sold in a deal he "couldn't pass up" and returned a month later along with a new all-wheel-drive dyno for his shop. Though Fran is most definitely a hardcore racer, driving through the night to be at the shop Monday morning after the Holley LS Fest and countless other events, he is a businessman first. He wasn't about to run the shop into the ground building the Z, so it took some time. Truth be told, its street-going counterpart was actually finished first. But we'll come back to that in a second.

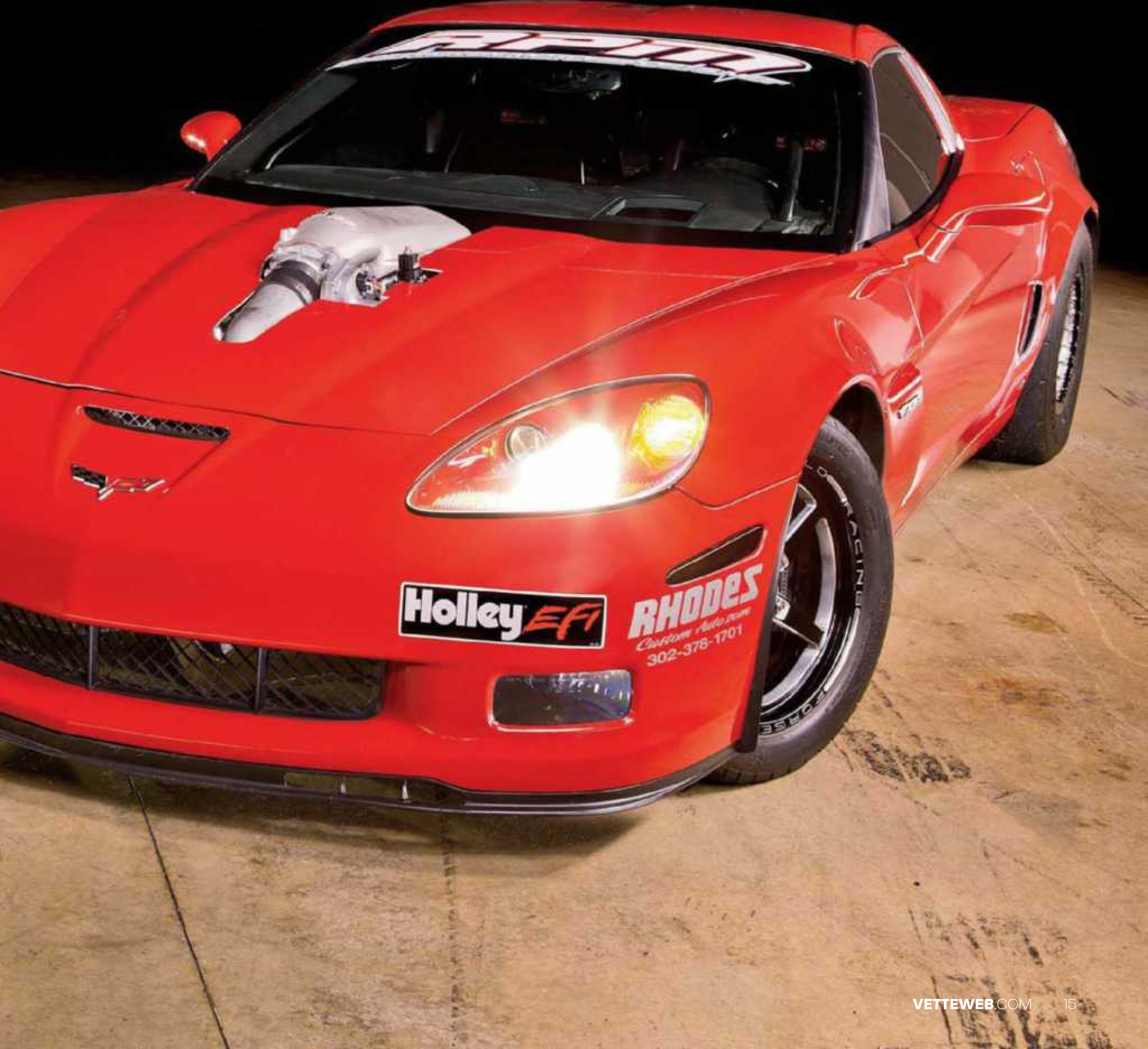
Rhodes Custom Auto was instrumental in turning the Z into an NHRA-legal race car by completing the specially designed SFI 25.3 rollcage and parachute mount for the aluminum frame. A TRZ Motorsports Outlaw full front suspension and crossmember were used



to cut weight off the nose, mating to a manual steering rack and AFCO coilovers. LG Motorsports billet drag spindles were used in the rear, along with C5 brakes to clear 15-inch wheels. An Aerospace Components brake kit was used in the front for weight savings. QA1 single-adjustable shocks and a Pfadt drag bar work with stock springs to control the still independently suspended rear.

The more street-friendly 4L80E conversion, completed years ago, was traded for the tried-and-true Powerglide for dedicated race use. RPM Transmissions built the entire transaxle, mating the two-speed to a custom 9-inch rearend with 3.89 gears and Driveshaft Shop axles. A Neal Chance billet bolt-together converter allows for stall speed adjustments and rebuilds as needed, mating to a Driveshaft Shop aluminum driveshaft. A Precision Performance Products shifter was mounted into the factory center console to command the transbrake and gear changes.

With the intention of competing in various Ultra Street classes as well as LSX Real Street, Fran ditched the LS7-based powerplant for something that could handle more boost and rpm. A Chevrolet Performance LSX block was bored out to 4.125 inches by Mahler Engine Service to mate to All-Pro cylinder heads with six head bolts per cylinder. Race Proven Motorsports assembled the engine with a Callies DragonSlayer 4.000-inch stroke crankshaft, Oliver billet rods, and boost-friendly JE pistons. Fran elected to use a wet-sump oiling system, outfitted with a high-volume Melling pump and Moroso pan. A Holley Hi-Rise



Holley
MagnaFuel

LS7 cast intake manifold was chosen for rules compliance, which gives the Vette its distinct front-end profile with the carefully cut hole through the stock hood for clearance. Fran had COMP Cams grind a custom solid roller camshaft that uses a Jesel shaft-mount rocker system for the high-rpm stability needed at over 8,800 rpm.

A Holley EFI Dominator is the brains behind this magnificent powerplant, commanding Holley coils, 160-pound injectors, and an OEM 90mm throttle body. All relevant data is communicated to the owner, tuner, and driver Fran Schatz via a Racepak dash. A high-volume MagnaFuel return-style fuel system with a fuel cell mounted in the hatch supply a large dose of VP Racing Q16. The matching supply of atmosphere is provided by a ProCharger F-1A-94 supercharger, using an A&A Corvette-based 10-rib drive system. An Innovators West harmonic damper helps spin the blower to 20-22 psi, chilled by a Chiseled Performance PT3000 air-to-water intercooler mounted in the engine bay. An ice water tank mounted in the hatch pulls double-duty for the intercooler and cooling system, as the Z's short blasts down the 1,320 require no radiator. Post combustion gases are sent through a set of stepped 2- to 2 1/8-inch headers with a 3 1/2-inch collector, H-pipe, and race mufflers, built by American Racing Headers.

By contrast, Mike Stevens' 2008 Corvette Z06 is just as potent, but in a much more street-friendly and durable package. According

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to Schatz, "Mine is set up for a particular class. His made whatever power we needed to make without killing the car. It will last forever, mine will not. We take it to the track every once in a while, but mostly just drive on the street." Stevens had previously commissioned Race Proven Motorsports to put together a twin-turbo Z06 with a 4L80E, but this time around he wanted a wild supercharger setup yet still with a full interior and air conditioning. As such, it has many of the stock parts intact, including the engine management system, front brakes, radiator, differential, and fuel tank – all of which are typical casualties in building a high-powered supercharged setup that can actually put the power to the ground.

Schatz tuned the stock ECM using Fuel Injector Connection 127 lb/hr squirters, stock coils, and a return-style fuel system with a MagnaFuel pump. A FAST LSXR intake manifold with a stock 90mm throttle body fits nicely under the aftermarket hood. Boost and C16 are funneled into Chevrolet Performance LSX/LS7 heads, CNC-ported by West Coast Cylinder Heads. These six-bolt heads are paired to a factory aluminum block that has been reworked by ERL Performance to provide the extra head bolts for better sealing and trusses for added strength. The ERL Super Deck block maintains the stock bore and stroke 427 cid,

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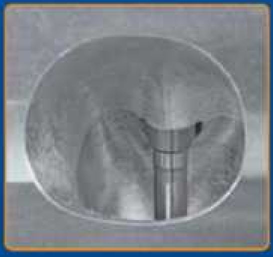
.400	296	212
.500	340	237
.600	375	249
.700	393	254

Tests conducted at 28" of water (pressure).
Bore size: 4.125"; exhaust with 2" pipe.



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when fitted with a Callies DragonSlayer crank, Oliver billet rods, and Wiseco pistons. Lubrication is supplied by the factory dry-sump system. A capable hydraulic roller was ground by COMP Cams, which still uses the stock 1.8:1 ratio rocker arms to command the valves. On the exhaust side, Stevens' C6 breathes through American Racing Headers straight 2-inch pipes with 3-inch collectors, X-pipe, and mufflers that dump before the axles.

Since this street car is not limited by class rules, Race Proven Motorsports chose the larger F-1X race supercharger. By stepping up from a 9-inch to a 10.5-inch volute, in addition to the larger inducer and exducer, ProCharger calculates its max flow at 2,000 cfm (not 1,625). Comparatively speaking, Stevens' F-1X doesn't have to work nearly as hard to hit the same 20-22 psi. A ProCharger velocity stack is placed on the volute for good measure, which rides on an A&A Corvette Direct Drive 8-rib bracket with an Innovators West balancer. ProCharger's C6 Race air-to-air intercooler staves off detonation. Again, without class restrictions, a Precision 66mm wastegate with an AMS-500 boost controller was installed to allow Stevens to dial-in the boost at will. Dual TiAL 50mm blow-off valves were used for safety. For added measure, a 50-shot from a Nitrous Outlet Brand X single nozzle is on standby, but since switching from the older F-1R blower it hasn't been necessary.

The drivetrain and suspension was kept much more tame, though equally as reliable as the race car. RPM Transmissions provided another Powerglide, though it would mate to a Stage 4 stock differential with 3.42 gears. The Driveshaft Shop's axles and driveshaft were also used, and a Circle D converter and flexplate complete the package. The chassis is upgraded with just a Pfadt drag bar, LG Motorsports drag spindles, and C5 rear brakes to fit a set of Weld Racing RT-S S71 15x10 rear wheels with Champion beadlocks. Both cars use these wheels along with AlumaStar 2.0 17x4.5 front wheels, M&H 185/55-17 skinnies and Mickey Thompson Pro 275 drag radials to eclipse 1.2-second 60-foot times. The street car is only four hundredths slower out of the hole on its way to an 8.21 at 167.57 mph. Meanwhile, the race car continues to get faster at the top end, going 7.83 at 179.95 mph at the Holley LS Fest.

It is safe to say that while both cars have 12,000 miles or less, they are not in what we'd call pristine condition anymore. But many would argue that having over 1,200 horsepower and 1,000 lb-ft of torque at the wheels is much better than "like-new." This goes twice for those who are able to enjoy that kind of power on a weekly basis. Some load up the trailer and hit the road, others hit the switch and go. There are many ways to enjoy your Corvette. That much is for sure. **VETTE**

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FEATURE

REUN

AFTER A 36-YEAR SEPARATION, RUSS BUFALINO GETS A SECOND CHANCE AT OWNING HIS FIRST NEW CAR

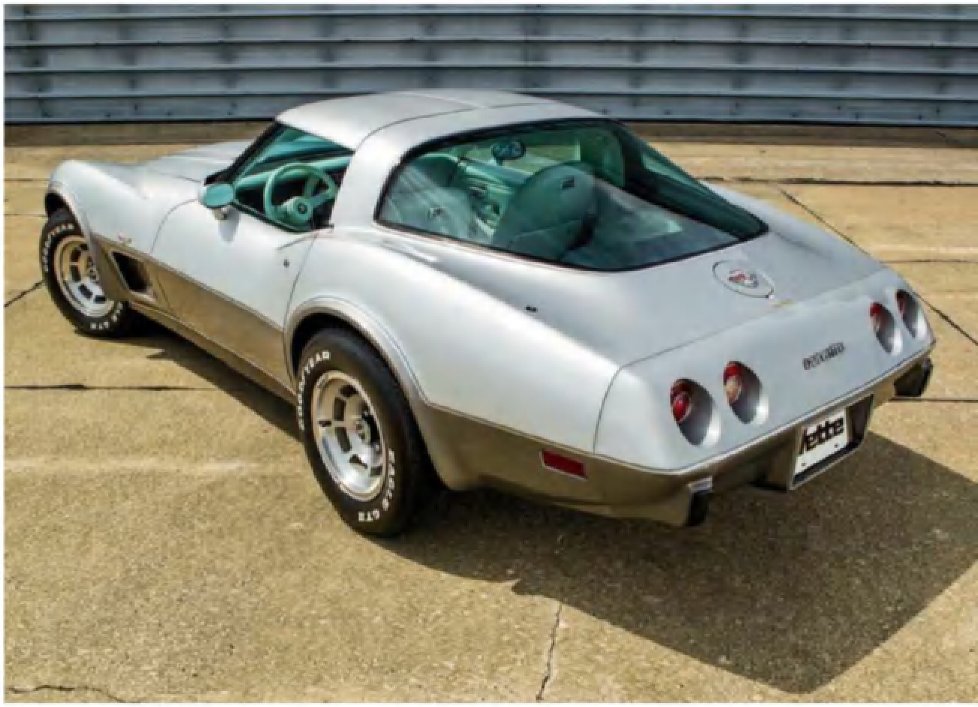
TEXT **JOHN MACHAQUEIRO**
PHOTOGRAPHY **THE AUTHOR**

ITED

When the Corvette bug bites, for many, it comes on at an early age. For Pennsylvanian Russ Bufalino that sting was delivered by a C2 at the ripe old age of 5. "My love for Corvettes began at an early age," he recalls. "My father would borrow my uncle's bright-red '63 coupe, and my brother and I would climb behind the seats and huddle in the back and go for a ride." By the age of 16, his father would again be responsible for fueling his Corvette fire. One day he came home from work and told Russ that a coworker had a '66 that he wanted to sell. As is the case with most teens, nothing seems impossible. He freely admits, "I became obsessed with trying to figure out how to come up with enough money to cover the $2,800 price tag. I pretty much knew that buying it was out of the question, as I had no real income at the time, but still the same, I started working on my dad to maybe float me a loan." After some convincing and a long list of promises his dad agreed to help him out.

For his first car, Russ had scored a '66 Rally Red/red interior convertible equipped with an L79 427/390-horse engine. Backed by an M21 close ratio four-speed manual gearbox mated to a Positraction rearend. This was one potent combo. By no means a stripper, it also included aluminum knock-off wheels, side exhaust, an AM/FM stereo, and tinted glass. As you can deduce from the option list, it was an envious ride for any 16-year-old.

After high school and a stint in college, Russ entered the working world. "I had a great job working construction, making a whole $9.00 an hour," he recalls. With a pocket full of cash each week and that youthful exuberance still intact, he set his sights on a new C3. This was in 1978, the year that Corvette was celebrating its 25th anniversary. After seeing the Silver Anniversary edition in a number of magazines, his choice was made. "My girlfriend and I took a trip to Hallman Chevrolet in Erie, Pennsylvania, to see what we could do," Russ states. "The salesman sat us down and explained that there was a possibility that even if we placed the order, it may not be filled because of the timing, as it was so close to the end of the model year." Undaunted by the potentially bad news, he went ahead and finalized the deal. "I recall going down the list of options, selecting everything that made sense, and some things that didn't at the time, like the Gymkhana suspension," Russ adds. "I had to have the hot engine, so the L82 got the check." When he arrived at the transmission choice, he caught an elbow for checking the four-speed manual. Wanting to stay on good terms and impress his girlfriend – now his wife – he quickly caved in and switched it to the automatic. After placing the deposit, he was instructed to call them weekly to see if a serial number had been generated. Weeks passed with no news and the



situation became quite bleak until the day of the phone call with the good news. From that day on, they drove the car and showed it off as any new Corvette owner would. He recalls, "I spent many uneasy hours worrying about it when it was parked while we went out to a movie, dinner, or shopping."

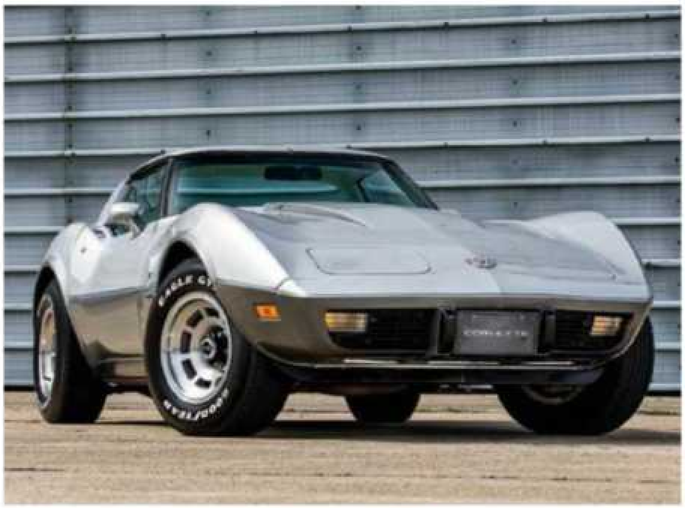
At this point, you might be thinking this guy has owned and preserved this '78 all these years? Not quite. After almost a year of ownership, reality took a stranglehold and tough decisions had to be made. Russ was in way over his head because he also had payments on two other new work vehicles. Rising insurance costs and diminishing garage space also played their part so he was forced to cut loose with the Corvette.

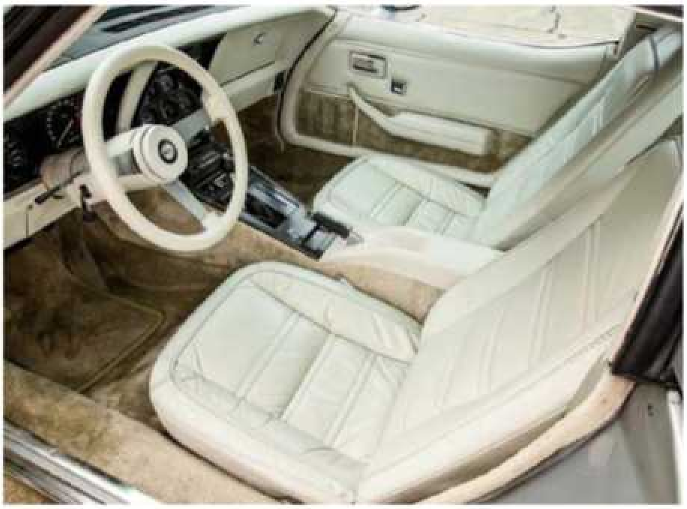
In the fall of 1979, he placed an ad in the *Pittsburgh Post Gazette* thinking he could draw more buyers from the big city for the Corvette. It didn't take long for the phone to ring with interested individuals. "I got a call from a man who expressed quite an interest in it," he explains. "This car was exactly what he was looking for. We made an appointment for him to meet me so he could check it out. Imagine my surprise when I opened the door, and there stood a priest!" The man of the cloth wanted the car, and he had a bag full of cash – all in small bills – so off it went to a new home. After less than a year, the new Corvette was gone. Russ still had the '66, but adult life and responsibilities took center stage. In the late 1980s, the C2 would suffer the same fate.

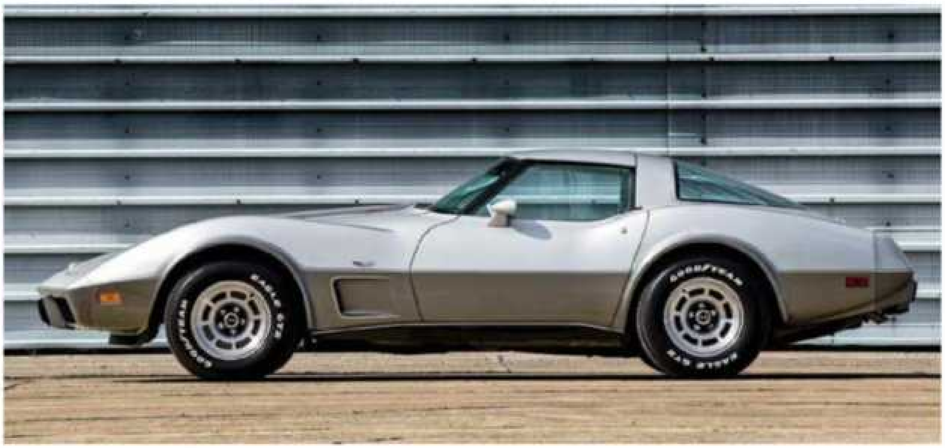
Fast-forward to 2012, and the '78 would again enter into his life. Russ recalls, "My brother, who is a pilot for FedEx, called and told me he was contacted by another FedEx pilot who asked if he knew me. He told him yes, and at that point was asked if I had ever owned a '78 Corvette. He then told him he had just purchased my old car." Excited at the prospect of again seeing his old car, Russ quickly contacted this individual. He was also interested in buying it back if it was for sale. Unfortunately, the owner had no intention of selling it, but Russ made it clear that if the situation changed, he would like to have a first shot at it.

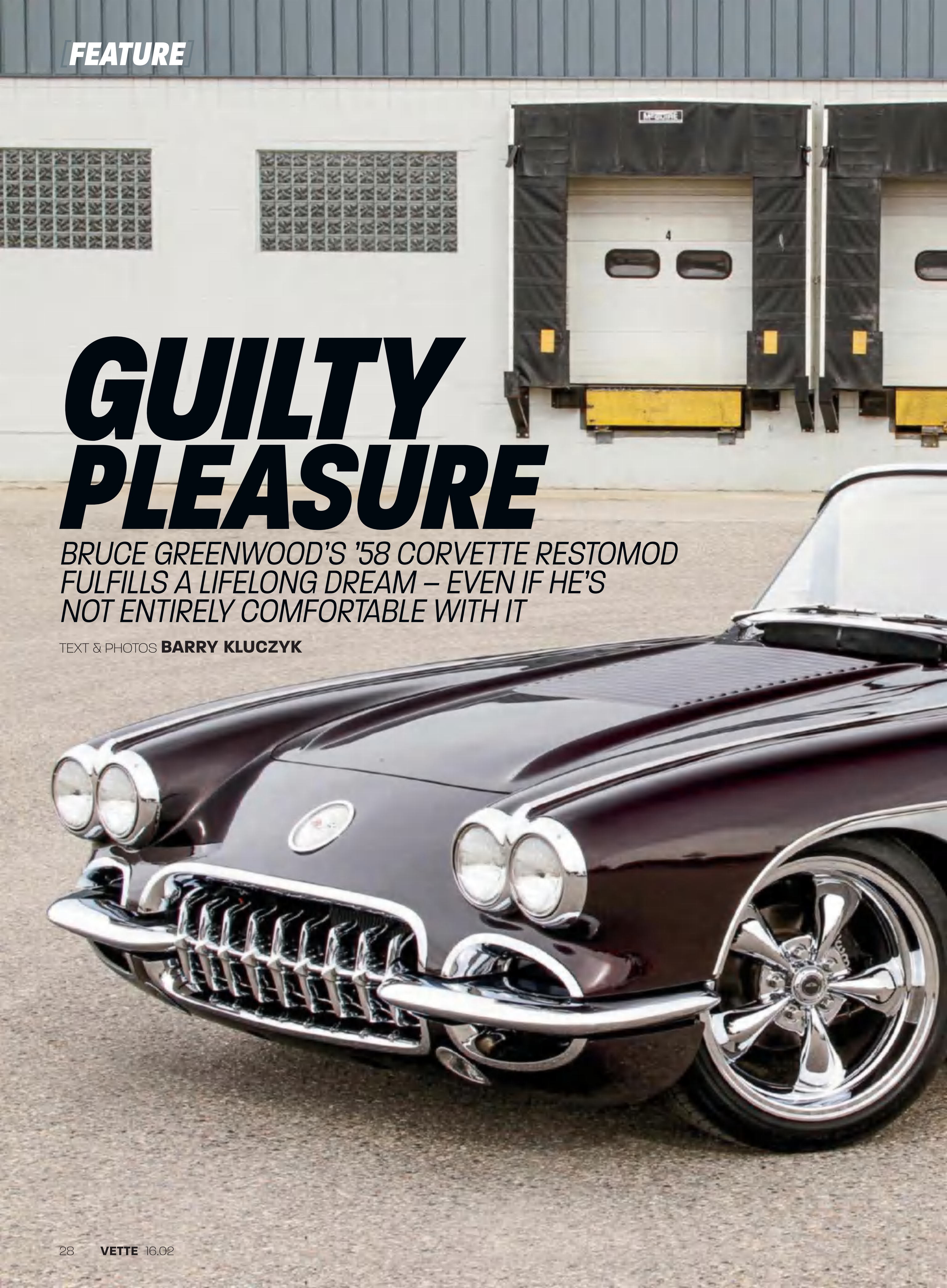
When he laid eyes on the car after all those years, he was amazed at how well preserved it was. Aside from a new battery, radiator hose, and tires, it was almost in the same condition as the day he sold it. He was also able to track the ownership lineage of the Corvette. The third owners were fanatical about keeping all the information and service records associated with it in a safe place. He found out that the priest sold it to a used car dealership in Aliquippa, Pennsylvania, in 1980, with 7,962 miles on the odometer. It was purchased in September of that year by the parents of the current owner. In 2009, with only 19,858 miles logged, he purchased the car. As was the case with Russ in his youth, a shift in priorities also forced him to eventually sell the '78.

On May 7, 2015, with only 20,754 miles clocked, Russ once again parked the '78 in his garage. He was able to purchase it for $100 less than what he sold it to the priest for back in 1979. In a story that comes full circle, the most important part for him after all these years are all the good memories associated with that car. Older and wiser, he knows those are where the true value lies. **VETTE**









GUILTY PLEASURE

BRUCE GREENWOOD'S '58 CORVETTE RESTOMOD FULFILLS A LIFELONG DREAM – EVEN IF HE'S NOT ENTIRELY COMFORTABLE WITH IT

TEXT & PHOTOS **BARRY KLUCZYK**

Like so many enthusiasts, Bruce Greenwood can pinpoint the moment a car imprinted on his grey matter, leaving an indelible image and a lifelong affinity. It was a 1958 Corvette he glimpsed at an open house event at Chevrolet's Van Nuys assembly plant. At the time, Van Nuys was one of eight Chevy plants across the country cranking out Biscaynes, Bel Airs, and other fullsize models, but the open house displayed all Chevrolet had to offer that year.

"My father worked at the plant and the open house was for the families of the employees, and even drew local dignitaries," says Greenwood. "I was 8 years old in 1958 and I still remember seeing that Corvette and falling in love with the dual headlights, the louvered hood, and all the chrome. It was marvelous and it was my dream car thereafter."

In the years that followed, the '58 Corvette remained an aspiration, but Greenwood was admittedly not a gasoline-in-the-veins car guy. He didn't cultivate a garage full of project cars, and life's other priorities always came first.

"When I was young, I didn't have any money," he says. "Then I got married and became a homeowner. A child came next and then I was immersed in a career that consumed 65-70 hours a week – and the list goes on. A lot of people have experienced the same."

About 10 years ago, Greenwood finally realized his decades-old dream and found a white 1958 Corvette. It was straight enough and had a 383 engine in it, but it wasn't going to earn Bloomington Gold or NCRS Top Flight status.

"To be honest, I didn't want to spend the money for a numbers-matching car," he says. "I'm not that kind of a purist. The style and presence was what I was after. The Corvette lost some of its 'bling' in 1959, so when I found a good '58, I made my move on it."

Although his wife, Nora, needled him for not getting a mid-year Sting Ray that she preferred, Greenwood nonetheless had his '58, but he didn't do anything with it until a serendipitous conversation during a charity dinner hosted by the Greenwoods in their Huntington Beach, California, home.

One of those in attendance was aerospace engineer Art Lofton, who spied the Corvette in Greenwood's garage.

"He said, 'I didn't know you were a car guy,' and I told him I wasn't," recalls Greenwood. "I was just a guy with an old Corvette that didn't look or run great and wasn't exactly sure what to do with it."

Lofton told him that when he was ready to have the car redone, he'd turn Greenwood on to builder Harold Martin, whom Lofton had worked with in his early years at General Motors. Martin, an engineer, entrepreneur, and drag racer runs Martin Motorsports, just outside of Detroit – and about 2,000 miles from the surf shops of Huntington Beach.

"I didn't take him [Lofton] seriously at first, but he kept calling and urging me," says Greenwood. "Then, one day, I went out to the car and the battery was dead. As I tried to get out the driver's seat to take care of it, I was stuck because a screwdriver in my back pocket had punctured the seat cushion."

After the cursing subsided, Greenwood decided it was time the car went to Detroit. He wasn't sure at the time what he wanted done with the car, but he was sure about what he didn't want.

"I wanted it to drive like a modern car," he says. "The solid-axle cars look great, but after all these years, their handling and braking performance leaves something to be desired. I wanted something with disc brakes, power steering, and fuel injection – a car that looked vintage, but drove modern."

Relying on Martin Motorsports to play the

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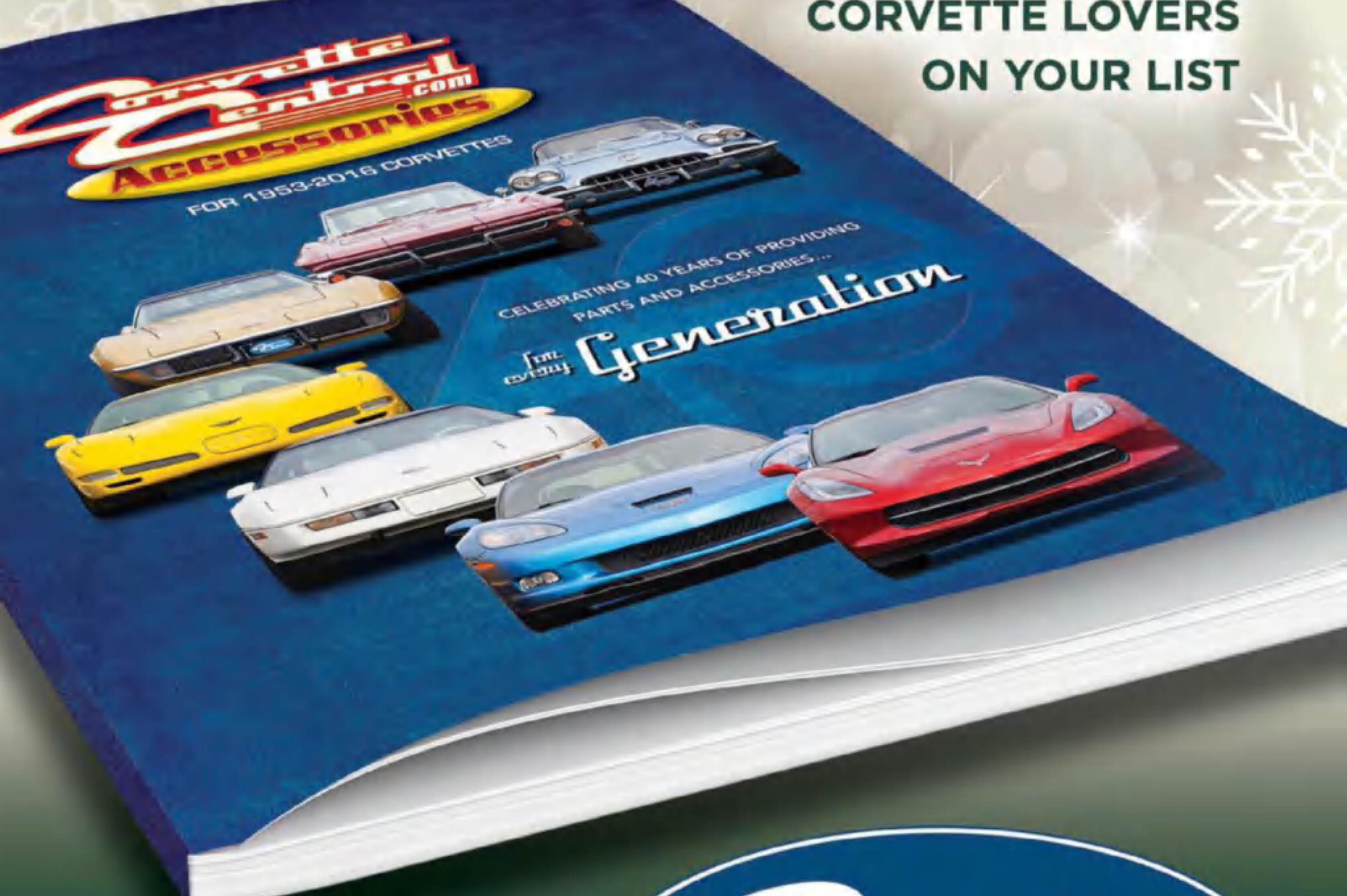

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architect role as much as the construction crew, Greenwood, Harold Martin, and Martin's lieutenant Brian Jones collaborated on the vision. The Martin team even pushed back against their client.

"I wanted them to paint the car blue and they flat-out refused, insisting it had to be red," says Greenwood. "We compromised on a custom color called Candy Romanesque Crimson, which sounds close to Roman Red but has a decidedly purplish hue. Looks great and very contemporary."

Of course, compromise is a two-way street and when Martin suggested they could extract 700 horsepower from the 383 small-block after building it, Greenwood countered.

"That was actually too much for what I wanted to use the car for," he says. "I like fast cars and all that, but I wanted more of a cruiser. Seven-hundred horsepower was too much and I told them to take it down a few notches."

After updating the rotating assembly with forged parts, porting the AFR 195 heads, and adding a Martin-crafted throttle body fuel-injection system atop an Edelbrock Air-Gap dual-plane intake, the 383 chimed in at a still-respectable 525 horsepower and 515 lb-ft of torque. Air is drawn into the engine via a custom air intake crafted by Martin Motorsports, while the outgoing air blows through a 3-inch exhaust system. The car has a soul-stirring rumble at idle, which crescendos into a spine-tingling mechanical wail as the revs climb, thanks to a variable exhaust feature – similar to what was offered on the C6 Corvette – also crafted by Martin.

A Tremec TKO five-speed manual transmission backs the fuel-injected stroker small-block and channels its torque to a Moser 12-bolt rear axle that's located with a custom four-bar suspension system and stabilizer bar in place of the original transverse leaf springs. Of course, the requisite set of disc brakes (from Wilwood) was installed all around.

The drivetrain and suspension upgrades were necessary to support all that twisting power the 383 could deliver, but the project faced another dilemma when it came to putting that power to the pavement. It needed a big footprint.

"I told them I wanted 275-series tires on the rear and they said it couldn't be done without tubbing the car," says Greenwood. "That would have meant losing the folding soft top, which I didn't want."

Rather than slice into the inner structure of the car to accommodate the big rubber, Martin's proposed solution was widening the rear fenders. Greenwood agonized over the prospect of "flared" fenders, no doubt with visions of 1970s metal-flaked customs in his mind. Martin assured him the fiberglass surgery would be virtually unnoticeable, so Greenwood swallowed hard and approved the mods. It was that or drive around SoCal with 525 horses on skinny, 195-series tires.

As it turned out, Greenwood needn't have worried. Rather than looking like the runner-up in a 1976 ISCA car show, the Corvette's sectioned and slightly stretched-out flanks – about an inch on each side – are so subtle they're basically undetectable. In fact, we doubt anyone viewing the car would guess they were modified in the slightest.

"They did a magnificent job there," says Greenwood. "The car looks great. We ended up with 245-series tires in the back. They may not be as wide as I originally wanted, but the result is perfect." For the record, the Vette rolls on chrome 18x9 American Racing AR605 Torq-Thrust wheels and Pirelli P Zero 245/45ZR18 tires.

There were no compromises made with the interior, which features custom-trimmed bucket seats in black Italian leather, a custom flat-bottom steering wheel, and upgraded instrument panel. Like the engine and exterior enhancements, they blend contemporary technologies with vintage aesthetics. The instrument panel, for example, features Dakota Digital's gorgeous VHX gauge cluster, which uses electronically controlled instruments that work with the engine control system. An analog face panel for the gauges fits into the stock instrument panel housing, enhancing that blend of the 20th and 21st centuries.

There's also an Alpine touch-screen infotainment system complemented by a rich sound system mounted behind the seats and under the hard tonneau cover. It includes Infinity speakers and a JB Audio amplifier; and it's the perfect accent for twilight blasts down Pacific Coast Highway.

"The changes to the suspension and the wider tires have made all the difference in how it drives," says Greenwood. "It feels stable and very controllable at speed – and power is intoxicating. The car hangs with Porsches just fine, which is very satisfying." It's not just Porsche drivers taking notice, either. The car draws more than its share of attention in an area that is thick with high-dollar hot rods and exotic supercars.

"The first time I rolled into Donut Derelicts on a Saturday morning, it was clear people were following with their eyes as the car rolled slowly through the parking lot," he says. "There was a crowd around it as soon as I stopped, too. It was a good feeling and Martin Motorsports deserves the credit for that."

Nevertheless, the values ingrained in a man who grew up in a working-class family can still generate twinges of conflict.

"Showing off is not something I'm used to and to be honest, building this car still feels like a somewhat selfish indulgence," says Greenwood. "But I'm quickly getting over it the more I drive it."

There's nothing to feel guilty about from our perspective. Working men need to fulfill their dreams, too. **VETTE**

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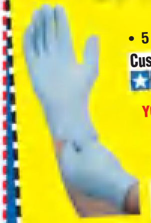

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TREND SETTING—PART 13

A LOOK BACK AT CHEVROLET'S EXPERIMENTAL, PROTOTYPE, CONCEPT CAR, AND SHOW CAR CORVETTES

SCOTT TEETERS WORDS | ILLUSTRATIONS
PHOTOS COURTESY OF **GENERAL MOTORS**

General Motors makes hundreds of kinds of cars and trucks. Some sell hundreds of thousands of units a year, which makes Chevrolet's Corvette a complete enigma. Given the small number of Corvettes sold every year, it is a modern American manufacturing miracle that the car survived for 61 years.

The Corvette was "officially" born on January 17, 1953 at the GM Motorama Show at the Waldorf Astoria Hotel, in New York. To understand the impact of Harley Earl's two-seater sports car concept car, you have to look at typical cars of 1953. The car was low and sleek, and wasn't over festooned with styling gimmicks. Based on the response from attendees, Chevrolet rushed the car into production, and the rest is history.

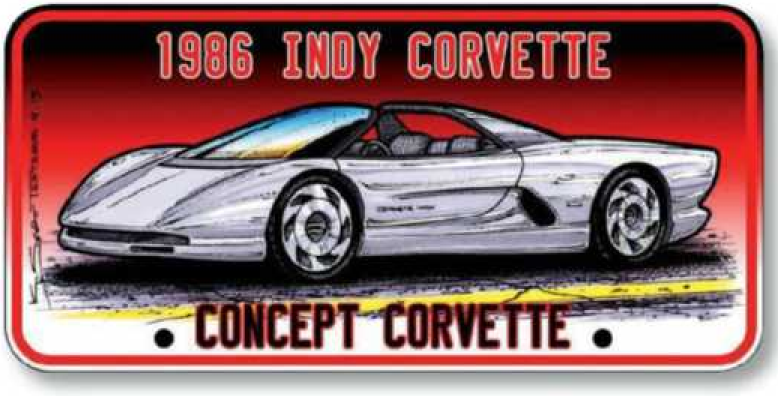
Today, the Corvette is GM's flagship car. When Chevrolet unleashes a new Corvette, the automotive world stops to take notice. But things were not always this way. Up to the C4, there were many inside GM that wanted to see the Corvette go away. For the first 20-some years, the car suffered from an identity crisis. Inside GM there were always those that wanted the Corvette to be something different; a lightweight sports car, a mid-engine car, a rear-engine car, a four-seater personal luxury car, powered by a boxer-type flat-six, Wankel rotary-powered, turbocharged small-displacement hemi-headed double-overhead cam powered, and even an all-aluminum car. Chevrolet kept the loyal faithful stoked with two or three experimental, prototype, show car Corvettes per year. From an enthusiast's perspective, this was endlessly fascinating.

This is Part Thirteen of a chronological look back at Chevrolet's high-profile experimental, prototype, concept car, and show car Corvettes. All three of these prototypes were designed to replace the C4 as the next-generation Corvette stuffed with the latest technology. The mid-engine Corvette Indy combined Italian-inspired styling with a host of electronics and a twin-turbo, 265-cube street version of the engine Chevrolet designed for IndyCar. It went from concept to reality within a span of two years, and as the Running Corvette Indy was coming together – so, too, was the CERV III. This final prototype took the Corvette Indy's designs to production level, trading the IndyCar engine for a twin-turbo LT5 and modifying the car's shape to meet various regulations and standards. With help from the newly purchased Lotus team, this roadworthy Corvette was the culmination of years of development. And it was the last mid-engine prototype Corvette shown to the public.

1986 Corvette Indy - Concept
The C5 Corvette That Never Happened

The lead-time needed to design a car can be considerable. Often, designers start the next generation of a car shortly after a new design is released for production. With rave reviews coming in for the new C4 Corvette (yes, in 1984 and 1985 the new C4 was hailed as "The best Vette yet!"), it was time to think ahead … way ahead.

The Corvette Indy Concept, the Running Corvette Indy, and the CERV III were all related, with the vague goal of becoming the C5 Corvette. It's important to keep in mind that while the Corvette Indy Concept looks like a real car, it was a fullsize "clay model." The "specifications," aside from dimensions, are a "wish-list" of goodies. The Running Corvette Indy was a for-real, drivable car, along the lines of the Mako Shark I and



Mako Shark II, the XP-882, and the 2-Rotor, and 4-Rotor Corvettes. The Running Corvette Indy was "functional," yes, but not a car that could be manufactured with basic features such as side windows that could go up and down. This was a pure concept car, designed to make everyone warm. The third and final stage, the CERV III was a fully featured car that could be built and sold.

In the early 1980s, Chevrolet engineers worked on a 2.65-liter IndyCar engine with twin intercooled turbos. The engine was never seriously raced, but its development stimulated many of the Corvette team designers. Also, computer chips and electronics were making inroads in production cars. GM's Design Vice President Chuck Jordan wanted these new technologies to be integrated into the design of the next-generation Corvette. Jordan began with a rendering from staff designer Tom Peters. The design hearkened back to the Italian-like shapes from the Bill Mitchell era. Jordan took the Peters rendering and "on paper" stuffed as much technology as he could into the sleek new shape.

The Corvette Indy Concept was another in a long line of mid-engine Corvettes. Other proposed "gee-whiz" features included active suspension, traction control, drive-by-wire steering, all-wheel-drive, ETAK navigation system, and four-wheel steering. The "Indy" name was used because the new car would have a 265-cid street-version of Chevrolet's IndyCar racing engine.

To take the rendering to the next stage, a show car model needed to be built. Jordan commissioned Cecomp of Turin, Italy, a workshop that built most of the show cars for nearly all of the top Italian design companies, to build a fullsize clay model of the Peters design. It was the three-dimensional, fullsize model that would take the design to the next level of a running prototype. Around the same time, GM had purchased Lotus, so the fullsize model was sent to Lotus for evaluation.

Chuck Jordan's nickname was "the Chrome Cobra" because he was extremely creative, bright, and competitive, with a habit of taking advantage of any perceived weakness – "striking" like a cobra. When the clay model arrived at Lotus, Peter Stevens, the lead Lotus design engineer was told by Jordan that nothing could be changed on the car, nothing! As delivered, the Corvette Indy model had a roof section. It turned out that because the cabin roof tilted in so severely, even Chuck Jordan could not sit in the driver's seat with the doors closed! Concept cars are one thing, real cars are another. The solution was to show the car as an open roadster.

The overall shape of the Corvette Indy was bigger than a production Corvette in every way except the height. The Corvette Indy was 7 inches shorter than a stock Corvette, but 10.4 inches longer and 8 inches wider. The wheelbase was 1.7 inches longer, with the front track 4.5 inches and rear track 5.4 inches wider than a stock Corvette. When viewed by itself, the car looks large, but when seen next to a production

Corvette, looks smaller due to its low height. The mid-engine drivetrain layout mandates a cab-forward shape, with the exotic engine visible through the rear window. Deep air intakes behind the doors and the inverted rear spoiler are similar to many LeMans-type racers of that time. The rear spoiler shape would later be used on the '93 Camaro. When the Corvette Indy was first shown it was silver with silver/gray interior. Later, it was painted red with a black B-pillar. As swoopy and sleek as the car looked, when the Lotus engineers put the car into the wind tunnel, they reported that the front-end lift was so great that it could have flown. Have we ever heard this before with Corvettes? Lotus' Peter Stevens reported, "After many hours in the wind tunnel we achieved a reasonable aero performance for a car that could potentially reach 200 mph!"

Clay prototypes are usually about 25 percent "too much" and have to be scaled back, but the model impressed GM officials. By the end of 1986, the first of two Running Corvette Indy cars was delivered, with the second car being completed in 1987. The running prototypes and the CERV III were developed at the same time.

1988 Running Corvette Indy

Chevrolet's testbed for advanced suspension and electronics

After seeing the fullsize Corvette Indy clay model, GM brass approved the construction of two running prototypes of the bold new design. Now it was time to make the Corvette Indy run. The clay models were a little over the top and needed to be pulled back, but the Running Corvette Indy still sizzled. Chevrolet's Advanced Vehicle Engineering had their Corvette work cut out for them because a more realistic version of the Corvette Indy was being build at the same time. This realistic version would become the CERV III.

To understand the purpose of the Running Corvette Indy/CERV III program, two key elements have to be considered. First, GM had recently purchased Lotus and was anxious to use Lotus' experimental "active suspension" concept in a high-profile car such as an advanced Corvette concept car. This would help showcase Lotus' skills and abilities. Second was the next wave of electronic computer-control systems for cars. We've come so far in 30 years that we have to stop and remember that in the mid-'80s things such as drive-by-wire, active suspensions, electronic traction-control, antilock brakes, satellite-based navigation systems, and carbon-fiber body parts were just futuristic dreams. The base model C7 Corvette is all that and more. It had to start somewhere and this was the beginning.

The overall design shape and hardware specifications came from the Corvette design team. Since GM had recently purchased Lotus, it was decided to use Lotus' suspension engineering skills to develop a prototype active suspension system. And finally, Cecomp, in Turin, Italy, was contracted to assemble the finished running vehicle.

The Corvette Indy Concept had to be pulled in and pushed here and there. The front end was shortened and the A- and B-pillars were thicker and more realistic. Extra ground clearance and wheel travel in the wheel openings was added and fixed headlights behind clear plastic covers were used. But the shape, flavor, style, and attitude of the Corvette Indy remained. The headlights look a lot like those on the C6.

Corvettes have always been about "what's under the hood." The Corvette Indy project started out a few years before, when Corvette engineers wanted to do something with the intercooled twin-turbocharged 2.65-liter Chevrolet IndyCar engine. The finished engine used in the Running Corvette Indy was rated at 600 horsepower. Production Corvettes from 1985 to 1987 had 230-240 horsepower. Placement was not only mid-engine (something that Duntov wanted for decades), but was also transverse mounted, just like the 1970 XP-882. The backbone chassis was made of carbon fiber rather than the Kevlar tub of the first version. Microprocessors and hydraulics replaced the entire standard suspension. The car had fulltime four-wheel drive, four-wheel steering, ABS brakes, and traction control. The active suspension allowed for smaller wheelhouses, fewer parts, and more interior room.

The interior of the Running Corvette Indy had some interesting features. The climate and audio controls were mounted on the door panel and the four-wheel-steering system was selectable. Another futuristic feature was the CRT-based instrument display and navigation screen. "CRT" stands for "cathode ray tube," same as an old-style "tube" TV screen. The navigation screen, something we all take for granted today, was very ambitious because in 1986 global positioning satellite systems (such as OnStar) weren't yet available for civilian use. Four-wheel steering was a trend that came-and-went so quickly hardly anyone noticed or missed it. At slow speeds, turning the front and rear wheels in opposite directions results in a smaller turning-radius. At higher speeds, turning all four wheels in concert improves high-speed stability. But in the late '80s when Honda and a few other car companies came out with four-wheel-steering systems they were complicated and sometimes produced unnerving handling.

Corvettes have long since been all about

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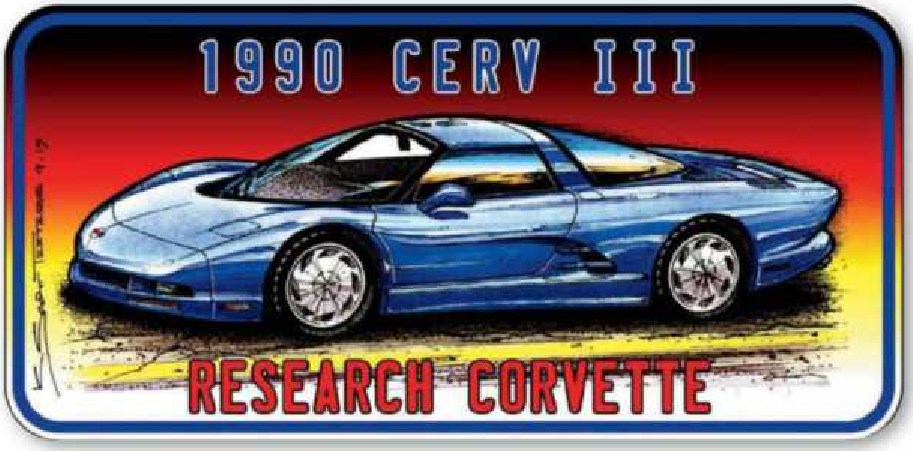

style, power, and performance, so with 600 horsepower on tap, the mind begs the question: how quick and fast? That question doesn't have an answer. It seems that if the car was ever seriously tested, that data was never released. It's more likely that the car was never tested for that kind of performance, considering the amount of R&D money that was poured into the two Running Corvette Indy cars that were built. Although the car certainly looks the part of a Bonneville Salt Flats speed record car, the Corvette Indy's purpose was to test advanced suspension and electronics.

The Running Corvette Indy was filled to the brim with advanced automotive technologies that today are standard features on not just Corvettes, but even entry-level cars. As a prototype, the Running Corvette Indy was a success! The next stage would be the production-like CERV III.

1990 CERV III Corvette
The "Finished" Corvette Indy, But Not the Next Vette

The CERV III was a real-world version of the Corvette Indy show car. It was also the first functional, electronic high-tech Corvette concept car. There was a long, dry spell of Corvette concept cars after the mid-engine 4-Rotor/Aerovette. Not only did the Corvette go through a total redesign, but electronic computer-control systems enabled fuel-injection to come back and along with it, solid, '60s-like performance with modern emissions ratings on unleaded gas. Computers were the best thing to happen to the Corvette since the big-block. Now it was time to see how far the envelope could be pushed.

The Corporate Engineering Research Vehicle III (CERV III) was more than pretty show car; it would be the most advanced Corvette study to date. Chief of Chevy III Studio Jerry Palmer handled the styling details, while Dick Balsey was the engineer on the project. The objective was to showcase the Chevrolet design team and Lotus' advanced racing experience. This was no easy task, by any means. Fullsize clay models and even running prototypes were one thing, a real production car is another. Since this was to be an R&D, as well as a showcase car, only the most exotic materials of the day were used. That aside, everything else was built to be near-production line ready.

The nose of the Indy had to be shortened and raised to meet bumper standards and the side windows flattened out so that they could go down into the doors. The wheel openings had to be opened up to allow 3.5 inches of travel and the rocker panels reshaped to accommodate side-mounted fuel cells. Also, the overall height had to be increased a few inches.

Since the car was completely built by race car builders Lotus in England, carbon fiber was used everywhere possible. The underbody was carbon fiber with a fiberglass-finish coating. Honeycomb aluminum was used extensively for reinforcement. The classic Lotus backbone chassis was made of carbon fiber and weighed only 38 pounds. The body was separate from the chassis and was attached by four hydraulic mounts. The complete body could be lifted off with the aid of quick-disconnect fittings for all of the electric and fuel lines. Power steering for the four-wheel-steering and the air-conditioning systems were mounted in the nose. The sides were filled with intercoolers, coolers for the active suspension and transmission, dry-sump oil system, and a fuel cell in each side for a combined 23.3 gallons.

Although the suspension looked normal, the springs and A-arms were made of titanium. Actuators were used in place of shock absorbers and were connected to a state-of-the-art computer-controlled active suspension system. ABS braking and traction control was also part of the package. The active suspension constantly measured pitch, yaw, and tire slippage on all four wheels – making adjustments as needed. The exotic suspension of the new C7 started here. The unique disc brakes used fixed calipers and dual rotors to double the braking surface that gripped from the inside of the rotors. The transverse-mounted engine used a six-speed automatic transmission that used two Turbo-Hydramatic 425 transmissions, modified with pieces from a 475 transmission. A transfer case drove front and rear posi differentials for the all-wheel-drive and four-wheel steering systems.

The CERV III's engine was just as exciting as the body shape. The yet to be released LT5 engine that would eventually power the 1990-'95 ZR-1 was treated to two Garrett T3 turbochargers that bumped the horsepower up to 650 and the torque to 655 lb-ft. The 3,400-pound CERV III ran 0-to-60 in 3.9 seconds, had a "calculated" top speed of 225 mph, and had 1.1 g's of lateral acceleration! This is C6 ZR1 territory in the late '80s!

So what happened, why wasn't the C5 based on the CERV III? Before the CERV III was shown at the 1990 Detroit Auto Show it was driven over 2,000 miles. That's not a lot as an R&D car, but enough to prove the car's roadworthiness, and a handful of guys had a great time, too. But Corvette sales were almost half that of 1985 figures, and Detroit was in another major slump. Besides, it was never Chevrolet's intention to take the CERV III into production; this was a pure research vehicle – a testbed for advanced electro-mechanical designs, that's why production specifications were put into the design. Designing cars in an electro-mechanical world is more than sculpting sexy-looking shapes.

Numbers were crunched on the CERV III as it was shown to the public. Customers would have been looking at a staggering $300,000 to $400,000 car – on par with the Ferrari F40 and the Porsche 959. CERV III was the last mid-engine Corvette prototype ever built. That is, unless we ever see the C8 Zora. **VETTE**

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BY **SCOTT PARKER** • PHOTOGRAPHY BY **JOHN MACHAQUEIRO** AND **THE AUTHOR**

The minute I slinked out of my rental car for the 2015 Corvettes at Carlisle, I was immediately awestruck by the sheer size of this event. Having been to the Carlisle Fairgrounds before, it was simply amazing that you could pack that many cars into one facility. Other events and car groups should feel shame. This is how you do a car show. I guess it is no wonder the Corvette team actually named a color after the event (Carlisle Blue), which could be found on quite a few in the show field. Most notably, it was on a particular ZR1 that had no problem lighting up a rather pricey set of Michelin Pilot Cup tires in front of a ravenous crowd at the main stage on Friday. The same day an American flag was constructed on the hill, made up of over 200 red, white, and blue Corvettes. For some shows, these 200 cars would be substantial, but the Fairgrounds packed in over 5,000 Corvettes and over 50,000 total guests from August 28-30.

No matter what year, generation, color, option codes, or style build you prefer, there were more than a few Corvettes you could drool over. The only negative of the show was that is was so big that it was easy to miss things. If you plan on attending next year, study the map and be strategic. Spectator parking could be found outside the event, there were many private lots that generally cost around $10 a day. Inside the event, there was Corvette-only parking if you didn't want to enter but drove your Vette to the show. At the north end of the Fairgrounds (on the hill and back) was the NCCC Concourse and a Fun Field, usually divided into generations and styles, and sometimes by car club. Another large Fun Field was located on the west side

Over 5,000 Corvettes came through these gates for the 2015 Corvettes at Carlisle. Over 450 took part in the downtown parade in Carlisle, Pennsylvania, on Saturday evening.

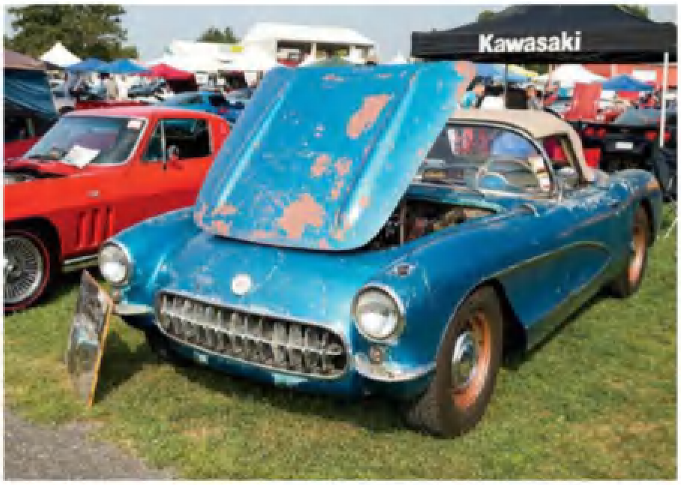
To celebrate the 50th anniversary of the 1965 Corvette, several special displays were located inside one of the buildings. This was a Development Mark IV 427 that Duntov smuggled out of Chevrolet Engineering and gave Delmo Johnson for the Sebring 12-Hour race in 1965. The highly publicized 1965 cutaway display from the World's Fair in 1964-'65 was set up next to it.

Inside the NCRS Gallery, located in an old dealership building on the southwest corner of the Fairgrounds facing the road, was an impressive display of award-winning restored and pristine unrestored Corvettes from 1954 to 2008.

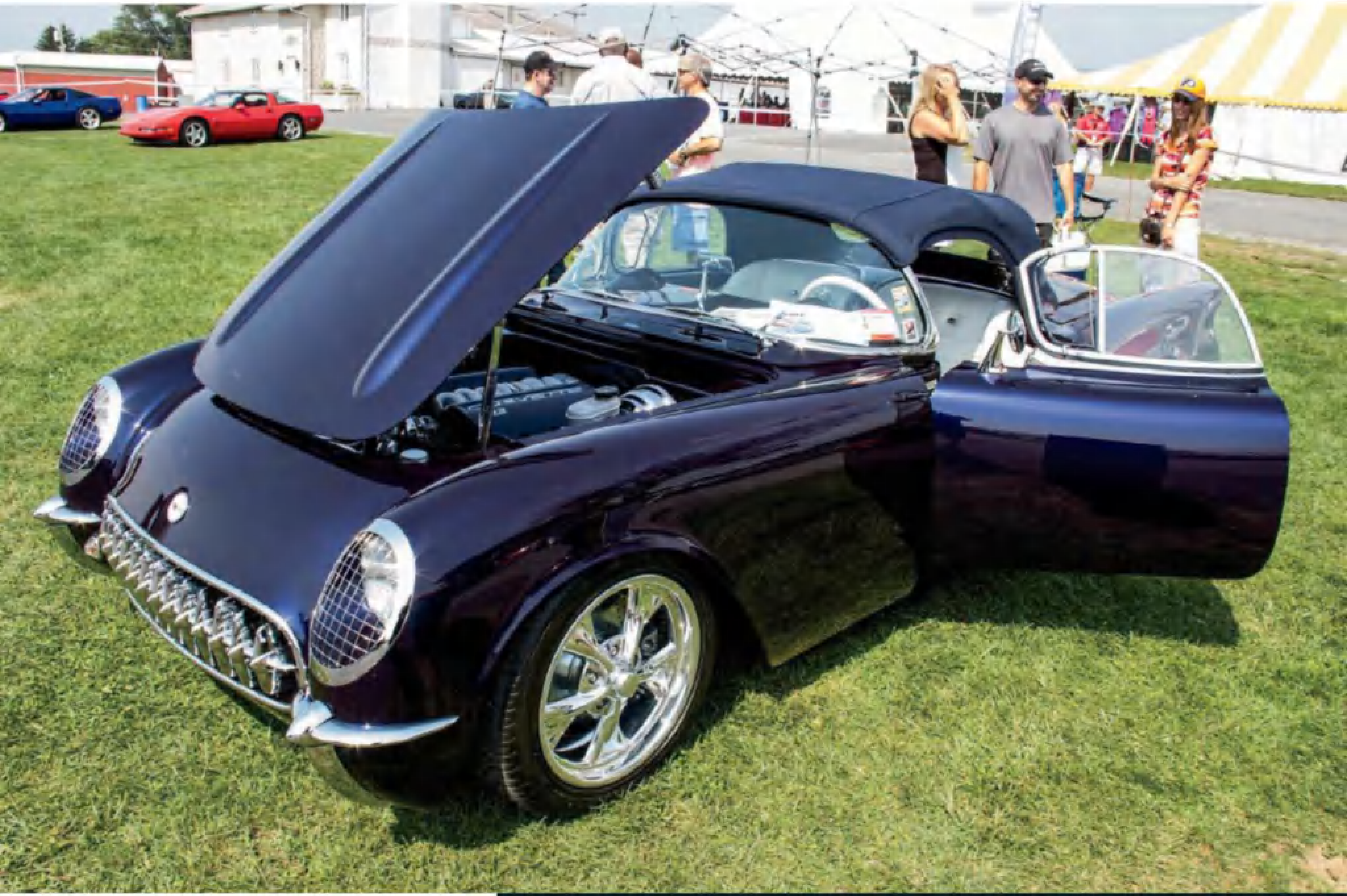
The swap meet area was simply enormous. Here you could find some real gems like those hard-to-find trim pieces as well as larger items like subframes and frames.

In the Callaway Owners Group you could find old and new. Here you see one of Callaway's twin-turbo C4s versus the C7 Z06 with the new 2.3L supercharger upgrade. In its most potent form the TPI made 403 hp and 575 lb-ft of torque, which was impressive for its day. Is this SC757 just as impressive making 757 hp and 777 lbs-ft? You be the judge.

The Team Chevrolet tent was a popular place to cool off and meet some of the engineers and designers of the C7, as well as check out some of the new Design Packages. The new style wheels on the Z06 were pretty sharp.



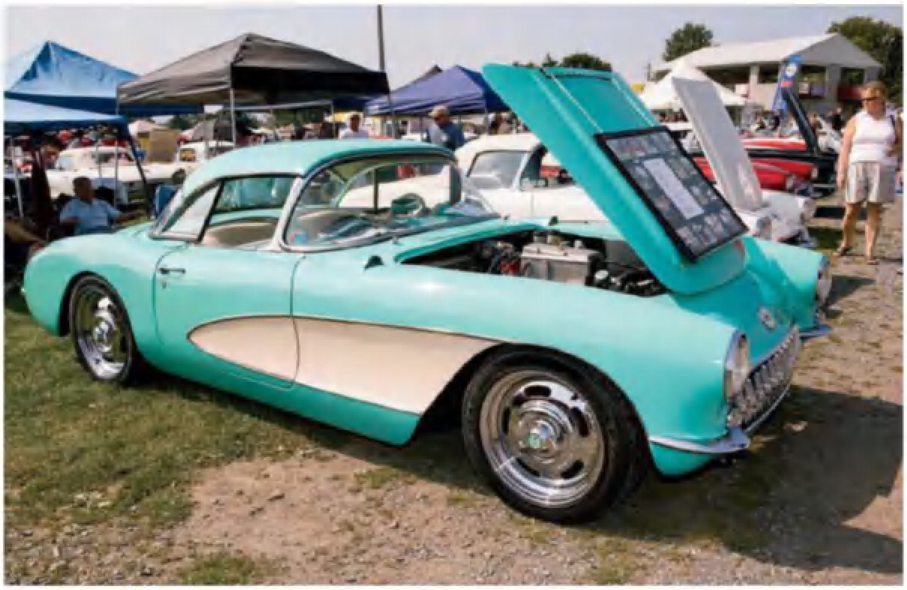
Solid-axle Corvettes had a designated spot at the show, but could also be found throughout. The body screams survivor on this '57, but the lowered stance, radials, and engine tell a different tale.



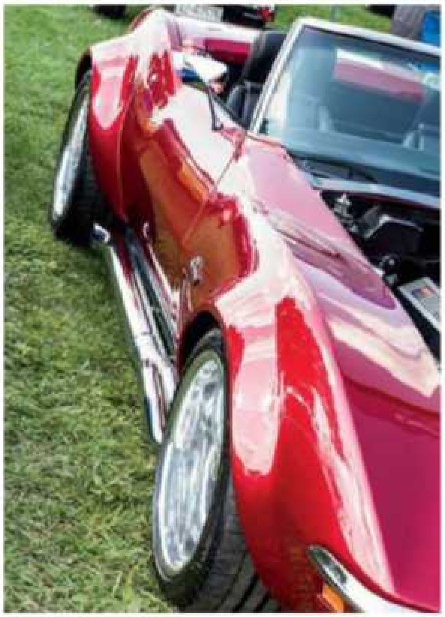
Ruth Exline's custom '54 has an LS3 crate engine, disc brakes, and all the modern amenities. As clean and well done as the exterior appears, the interior is even better. Perhaps that's why it won a celebrity choice award.

toward the middle, by the entrance and registration, which was open to any generation, year, etc. Interspersed in that general area were special sections for various car clubs, the Callaway Owners Group, a Solid Axle Display, tented areas for the '63-'67 Stingray Registry, and a 1965 Corvette display to celebrate its 50th birthday. The center of the grounds had a ZR-1 display, Team Chevrolet tent, manufacturers midway, stage and grandstand, food court, and installation alley. Below that were a few buildings with even more Corvettes (including the 1965 World's Fair Corvette Display), an enormous swap meet taking up the entire south side, and the NCRS gallery is in the southwest corner.

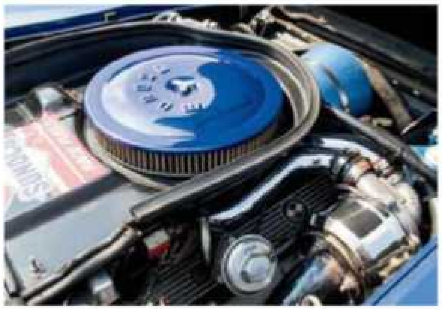
Outside of the normal goings-on with the car show, swap meet, and installation of exhaust systems, the Carlisle Events crew put together a long list of activities for the non-enthusiast spouse and kids as well as Corvette seminars from various sponsors on a variety of topics. Guests ranged from retired Corvette Chief Engineer Dave McLellan and retired Corvette Plant Manager Wil Cooksey to Chip Foose (no introduction needed). Those who crave action could satisfy their needs either at the burnout contest on Friday or the autocross



The stance on this hardtop '57 fuelie is just perfect. This is proof you can have a nicely restored classic without the ride height of a 4x4.



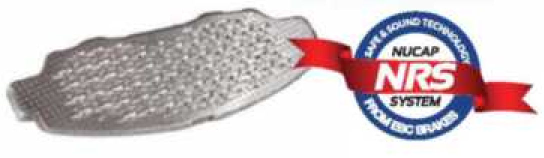
Mike Boyles Corvette Center in Archdale, North Carolina, put this custom C3 together with gargantuan fender flares to stuff a set of deep-dish Intro wheels. Under the hood is a Chevrolet Performance 502ci big-block, and the interior is upgraded to match with C4 seats and other custom touches.



Speaking of widebodies, check out the turbocharged powerplant on this 1981 Greenwood Daytona. The late John Greenwood signed the air cleaner of this Sunoco Blue 1 of 4. Bill and Mary Lou Valentine own serial number 2, which was built as a replica of Greenwood's Daytona race car.

on Sunday. A fitting tribute was given to the late Chip Miller, co-founder of Corvettes at Carlisle, on Saturday at noon with a collective moment of revving. The lovely ladies competing for Ms. Carlisle strutted on stage on Saturday afternoon, which also revved up the crowd of enthusiasts. The day concluded with a 450+ Corvette parade and street party through downtown Carlisle until 9:30 p.m. The largest to date! Awards were given out Saturday as well as Sunday as the crowd wound down.

If all of this doesn't get you excited for next year's event, it is time to check your pulse. The 2016 Corvettes at Carlisle is scheduled for August 26-28. Start planning now! VETTE



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Lots of C4 ZR-1s, stock and modified — like this one — were on-site as part of the ZR-1 display.

There were even a few old race cars. This one was sandwiched between a 600hp naturally aspirated ZR-1, tuned by John Lingenfelter himself, and G. Gordon Liddy's ZR-1. Not bad company to keep.

Up the hill there were some late-model gems like Brandon Griggs' 2001 with aftermarket quarter-panels, Bogart wheels, and drag radials. This C5 looked like it was ready to run.

Oh, and in case you thought the C7 wasn't well represented. Most of the C7s we saw, though, were in Corvette-only parking and not part of the car show.

Carlisle Blue C6s were (appropriately) in abundance in Carlisle.

This C6 Z06 is also track-ready. The Weld RT-S wheels with drag radials prove this bad boy isn't playing around. The rowdy idle piping through a set of long-tube headers with modified stock exhaust really got our attention. As it turns out, this thing is packing an LME-built 430-cube LS7 with a Nitrous Outlet 200-shot.

A full autocross course was set up in the northwest corner of the Fairgrounds, with timing equipment, cones, corner workers, and even instructors on hand to help novice drivers. This modified C4 was the quickest car on the course, which you'd expect from the sticky Hoosier slicks, running around 41 seconds.

To celebrate the 50th anniversary of the 1965 model, they were given a tent and row of their own.

As the storyboard explains, this '57 fuelie was used as a drag car from 1972 to 1982 and fully restored from 1992 to 2003 by the owner.

This Grand Sport replica marries an Advanced Composite Products body, tube chassis from All Pro Cars (Muncie, PA), Chevrolet Performance 502ci big-block crate engine, and a Tremec five-speed transmission.

With so many killer Corvettes in one place, judging was tight. Early (metal bumper) C3s have really taken off, and as the result there were some incredibly restored examples at this year's show.

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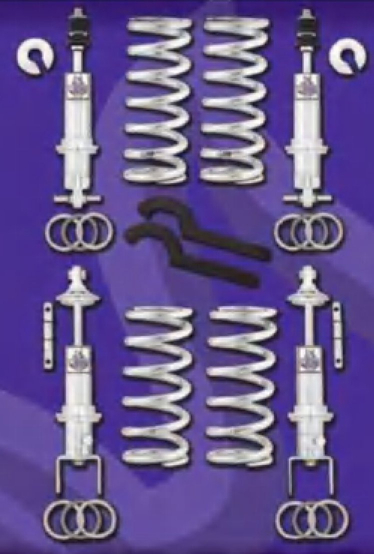

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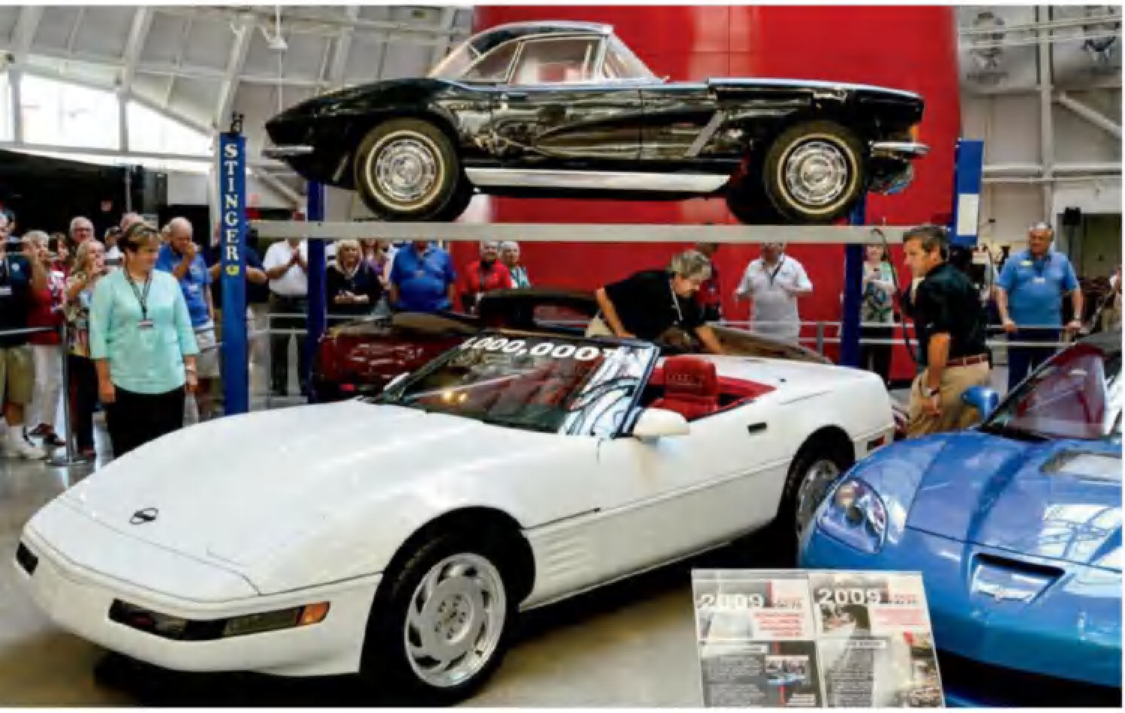


Only three of the eight Corvettes that fell into the sinkhole were considered repairable. They are the black 1962 convertible, the 2009 "Blue Devil" ZR1, and the white 1-millionth convertible. GM restored the ZR1 and the 1-millionth, which was unveiled at the ribbon-cutting ceremony.

Multi-time Corvette C5R and C6.R GT winner Ron Fellows offers a high-performance Corvette driving experience at the Spring Mountain Motor Resort & Country Club in Pahrump, Nevada. Yes, this Blade Silver Z06 is a training car.

NCM 21ST ANNIVERSARY CELEBRATION

SKYDOME REOPENS AFTER SINKHOLE REPAIR IS COMPLETE

TEXT **WALT THURN**
PHOTOGRAPHY BY **THE AUTHOR** AND THE **NATIONAL CORVETTE MUSEUM**

This year marks the 21st Anniversary of the National Corvette Museum, located south of the Bowling Green Corvette Assembly Plant. Since 1994, the museum has undergone significant expansion, including the new NCM Motorsports Park that was dedicated last year. The most unexpected event happened to the museum on February 12, 2014, when a large sinkhole opened inside the Skydome and swallowed eight Corvettes. Team *Vette* did a four-part series on the cars that fell into that hole. The news gained worldwide attention, which resulted in a dramatic increase in attendance. After extensive repair work, the Skydome reopened with a ribbon cutting ceremony on September 3, 2015. The repair required extensive use of micro-pilings to ensure this area would never collapse again. Three of the eight Corvettes were repairable (the 1962 convertible, the 2009 ZR1 prototype, and the 1992 1-millionth convertible). The 1962 convertible will be repaired by the museum and GM agreed to repair the ZR1 and the 1-millionth convertible. The lightly damaged ZR1 was repaired and returned to the museum earlier.

The repaired 1-millionth was unveiled during the Skydome reopening ceremony. That work took place at GM's Mechanical Assembly and Fabrication Shops in Warren, Michigan. It took 30 craftsman and technicians to complete the restoration. When the car was dismantled the team discovered hundreds of signatures from workers who signed the car during its assembly. They were able to save all but one signature, from retired plant employee Angela Lamb. During the ceremony the cover was removed by GM's John Cafaro and Dave Bolognino and the 1-millionth Corvette looked new. Now retired, Angela Lamb agreed to sign a replacement panel at the ceremony. Dave replaced the signed missing right side gill panel and the restoration was complete.

LEFT: Nowicki Autosport Design displayed this C7 coupe with its company's products added at the Michelin tire display. Nowicki has been a longtime supporter of Michelin Tire products.

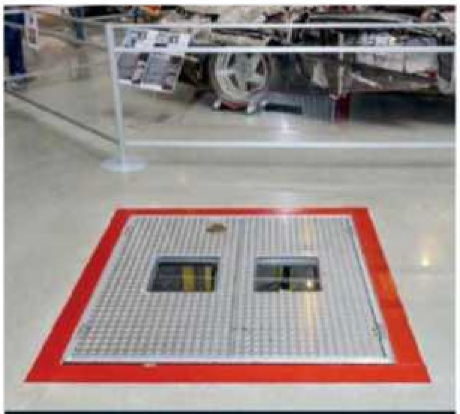
The new-for-2016 color Long Beach Red looks stunning when paired with the Spice Red (RPO ZLE) interior on this Z06-equipped convertible.

Katie Frassinelli, NCM's Marketing/Communications Manager announced that a new "Thunderdome" exhibit will open in November. It will include a multimedia experience that allows visitors to experience the sinkhole first hand. A miniature Skydome is being constructed, where 15 guests at a time can experience a simulation of the sinkhole.

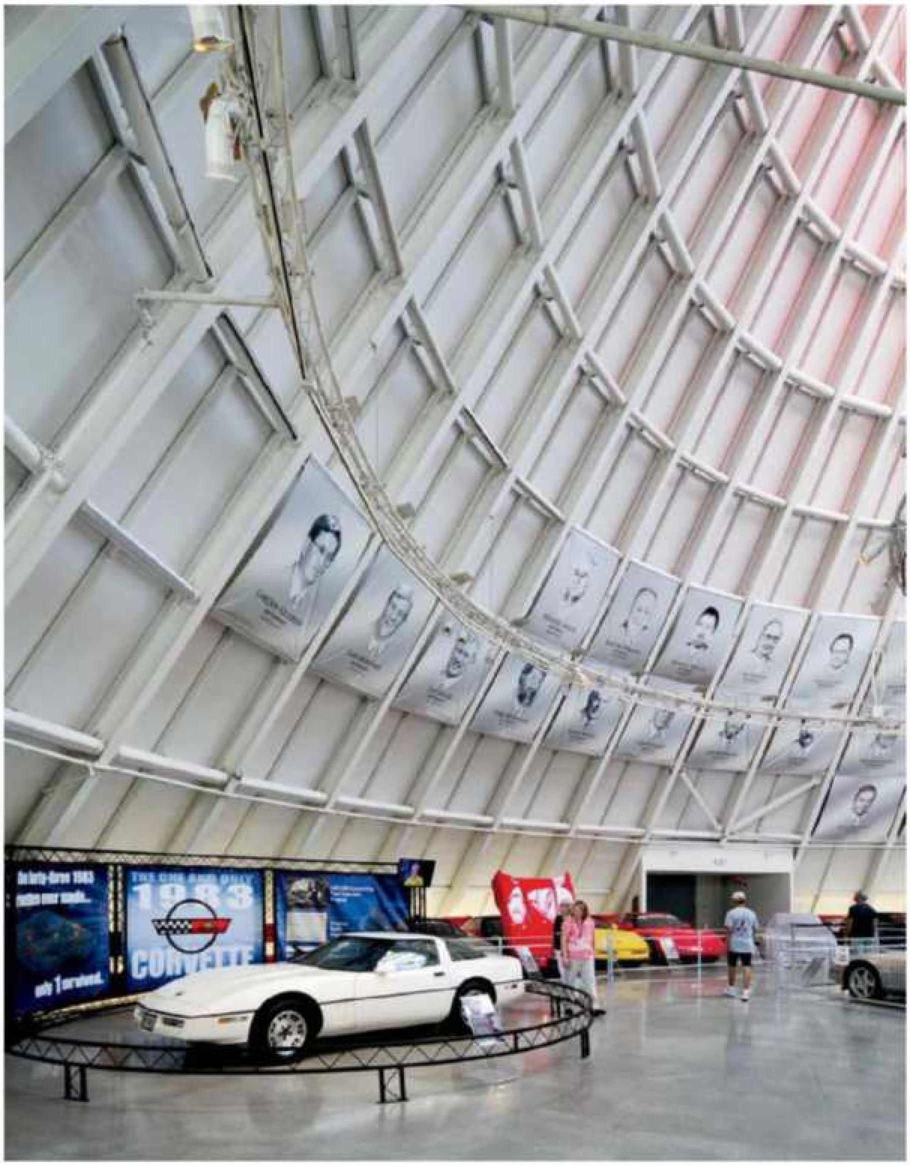
The three-day anniversary celebration event was packed with seminars that included sessions with past and present Hall of Fame inductees. The presentations included:

- What's Under the Skydome – Dr. Jason Polk
- Skydome and Sinkhole Repair - Zach Massey
- Meet the New Plant Manager – Kai Spande
- Past and Present Hall of Fame Discussion – HOF Members
- Introduction to the 2016 Corvette – GM Team
- How to Properly Insure your Corvette – Adam Boca

This is a small sampling of the many presentations held during the weekend. In addition, a Celebrity Car Show took place on Friday. Throughout the weekend a High Performance Driving Event was held at the NCM Motorsports Park. For those not racing, shuttles were provided to visitors to observe how Corvettes perform. The GM Team also provided a walk around the 2016 Corvettes and explained its new features. The Labor Day event is a great way to spend time with other Corvette owners and enthusiasts. It is a relaxing way to spend a Labor Day weekend surrounded by Corvettes and Corvette enthusiasts. For more information on the museum's schedule go to the National Corvette Museum website: www.corvettemuseum.org. VETTE



This double door hatch leads down 40 feet to the underground cavern. This allows engineers to keep a close eye on any changes that might occur to the cave structure.



The repaired NCM Skydome has a completely new look. It features a flat floor, with no carpet or elevated areas. It has a more expansive look and the floor sits on hundreds of micro-pilings attached to the bedrock. Some reach almost 300 feet beneath the floor. The large access door behind the red ZR-1, used for construction, will serve as a maintenance entrance to the Skydome.

Museum Director Wendell Strode (right) cutting the ribbon for the Skydome reopening ceremony. He is assisted by folks from Scott, Murphy & Daniel Construction and Christy Thomas (NCM Finance and HR Director, far left).

Restorers found signatures from plant workers all over the 1-millionth Corvette. They were able to preserve all but one. The missing signature from Angela Lamb was located on a badly damaged gill panel. Angela, now retired, agreed to sign the panel. GM Director of Design Fabrication Operations Dave Bolognino (left) and Executive Director of Chevrolet Global Design John Cafaro hold the panel.

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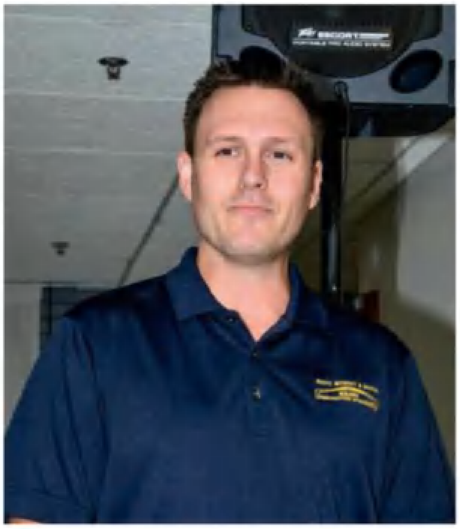
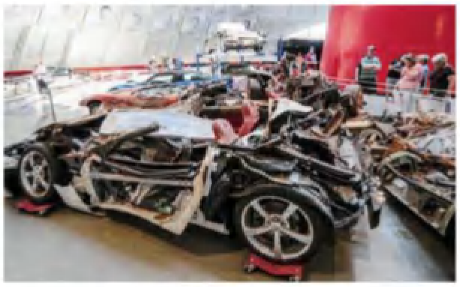


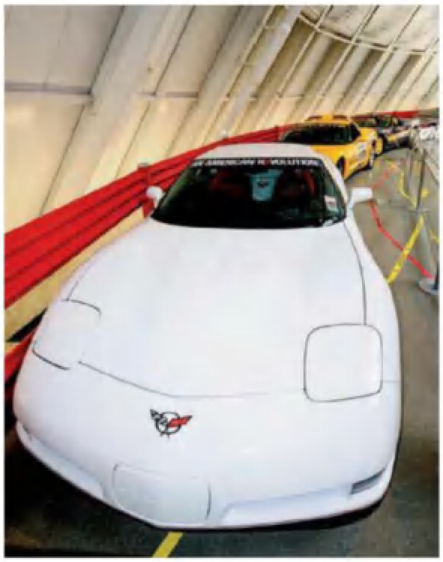
Zach Massey from Scott, Murphy & Daniel Construction Company served as the Skydome renovation project manager. His regular video updates helped keep NCM members, enthusiasts, and the public up to date on the sinkhole repair progress. He opened the ribbon-cutting event with an overview of the project. Job well done, Zach!

Dave Bolognino reinstalls the newly signed gill panel onto the right side of the 1-millionth Corvette to complete its restoration.



The eight cars that fell into the sinkhole are on display near the center of the Skydome. They are: 1.5-millionth convertible, ZR-1 Spyder, Mallett Z06, PPG Pacecar, 40th Anniversary, 1962 Corvette, "Blue Devil," and the 1-millionth convertible.

Corvette Racing provided free T-shirts and photos at their impressive outside display. The cutaway C7 Z06 always attracts a crowd.



Corvette Indy pace cars are lined up against the outside edge of the Skydome. The yellow tape line that is embedded into the floor shows the outline of the underground cave. The pink tape outlines the sinkhole area that collapsed.

Construction is well underway for the $1.8 million Holley Control Tower. The completed 14,635 square-foot tower will provide a large viewing area, meeting rooms, classrooms, retail space, and administrative offices. A new noise abatement berm is also nearing completion between the Circle Clark neighborhood and the track on 10 acres of optioned property.

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SUPERCHARGER HEAVEN

HOW TO CHOOSE THE BEST BLOWER FOR YOUR CORVETTE

BY **RICK JENSEN**

PHOTOGRAPHY COURTESY OF **THE MANUFACTURERS**

It's hard to believe that automotive superchargers have been around since the early 1900s. As far as performance aftermarket blowers go, McCulloch led the way in the 1930s with a centrifugal unit, and a PEPCO roots-type blower was introduced about a decade later. Buried in a dusty box somewhere in my shop is a 1950s-era McCulloch VS57. My gearhead grandfather bolted it up to a '50s Oldsmobile, then proceeded to burn rubber and knock over roadside speed cameras in Nebraska. Apparently, ye olden times before fast cop cars and police radios were good times. And interestingly enough, these early superchargers look very similar to today's models.

Back in those days, superchargers were downright hellish to tune. But like so many performance products, the arrival of modern technology has made them more user-friendly than ever. With today's EFI systems, hot ignition boxes, and blow-through carburetors, adding a supercharger can add hundreds of horsepower with little effect on drivability, fuel economy, or emissions legality.

Today there are three different types of superchargers to choose from. All have their own strengths and weaknesses, so for the purpose of this guide, we'll discuss each type, then give you some examples of what's currently on the market.

SUPERCHARGER TYPES

A **centrifugal** blower looks similar to a turbocharger—it has an external scroll shape and an internal compressor wheel. But a centrifugal differs from a turbo in that instead of using an exhaust turbine wheel to spin the compressor wheel, it is belt-driven and uses step-up gears to create highly pressurized air. The benefits of a centrifugal supercharger are manageable low-rpm torque and great mid-range and high-rpm power, high efficiency (especially with intercooled systems), good fuel mileage, and a small head unit size that'll squeeze into a packed engine bay. Drawbacks include a more complex installation, taking up more space with intercoolers and their plumbing, and breaking or throwing belts more often.

A **roots** blower works by paddling air with two intermeshing rotors. Roots blowers combine the supercharger and the intercooler into one unit, which mounts on top of the engine. As such, one large benefit is that these systems take up little space in the engine bay, and many new ones fit under stock hoods. They also are less complicated to install, and offer instant boost off idle. However, instant boost on street tires can be a drawback too, and can shock your drivetrain pieces harder than a centrifugal would. And comparatively speaking, roots blowers typically can't run as much boost, and aren't as efficient at high rpm compared to their snail-shaped competitors. And there are still a few models out there that don't fit underneath a Vette's stock hood.

Finally, **twin-screw** blowers look very similar to roots blowers and use a set of screw-shaped rotors to compress air. They also mount on top of the engine and incorporate an internal intercooler. Often larger than roots blowers, twin-screws can run big boost while being highly efficient, are popular with enthusiasts and racers trying to make huge power, and are much quieter than other blower types. Disadvantages include a higher price point, a larger size, and having to replace your stock hood for clearance.

The Chevrolet Performance LS9 blower is a big reason why the ZR1 Corvette pumped out 638 ponies. It's an Eaton twin-rotor design that displaces 2.3 liters and features coated, four-lobe rotors with 160-degree twist for high efficiency. And an integrated, dual-brick air-to-liquid intercooler cools the compressed air before it's ingested. On the mighty ZR1, this setup dropped the compressed air's temp a whopping 140 degrees. The blower includes the supercharger intake system, a cast cover and intercooler, 48-pound injectors, injector harness, fuel rails, front pulley, throttle body, and gasket set.

If your LS7 Z's 505 horses ain't cutting it anymore, Edelbrock's Stage 1 E-Force blower can cram enough air into those cylinders to make 657 horses and 582 lb-ft of torque. The roots design and 12-inch intake runners create tire-melting torque at low rpm, while still adding over 150 ponies on the top end. This kit is tailor-made for the Z06, and includes an LS7-specific manifold and seamless integration to the factory dry-sump oiling system. Throw in its compatibility with the stock hood and its 50-state emissions-legal status and you've got a killer blower system—just add tuning.

Even high-compression 2014-'15 LT1s can benefit from E-Force power—Edelbrock's 1571 Stage 1 system bumps the Stingray's power from 460 horses and 465 lb-ft to a whopping 624 horsepower and 600 lb-ft. And with that 3.5-inch pulley spun up, the torque tops 500 lb-ft just off idle, and stays above that number all the way to redline. Like Edelbrock's other Stage 1 systems, the C7 kit is emissions-legal in 50 states and fits nicely under that stunning stock hood.

With a Magnuson C7 Heartbeat system pushing only 6 psi of boost, it makes 120 horses and 120 lb-ft of torque at the rear wheels, which works out to be around 140 hp and 140 lb-ft at the flywheel. This combo is easily 50-state emissions legal, fits under the stock hood, and includes all necessary parts like a front-mount heat exchanger, intercooler pump, hoses, brackets, wiring, tuning, and full-color instructions. Of course, if you want to push things harder this Heartbeat kit can fit throttle bodies as big as 108 mm—and Magnuson offers numerous pulley upgrades to up the boost.

SUPERCHARGER TECHNOLOGY

The centrifugal and roots-type superchargers listed in this guide feature highly advanced **compressor wheel** and **rotor** technology. On the roots side, most aftermarket blowers now use Eaton's 2.3-liter Twin Vortices Series (TVS) technology. These high-tech units use **four-lobe rotors**, high 160-degree **twist angles**, and big **inlet and outlet ports**, which results in higher capacity, higher operating speeds, and thermal efficiency up to 75 percent across a wide operating range. And as this Eaton system saw production in the 2009-'13 ZR1, they're damn reliable to boot.

And centrifugal compressor wheels are always evolving as well. Vortech's V-3 Si is a popular choice for first-time blower owners: it offers a high-efficiency **impeller** and **compressor housing**, a helical **gear design** with 3.6:1 **step-up**, and a **self-contained lubrication** design with an oil drain for easier installation and maintenance, as well as added reliability. It is up to 78 percent efficient, has a 1,150-cfm **max flow rating**, and can run up to 22 pounds of boost with supporting engine mods. All in all, the V-3 is perfect for the entry-level supercharger customer looking for up to 775 horsepower.

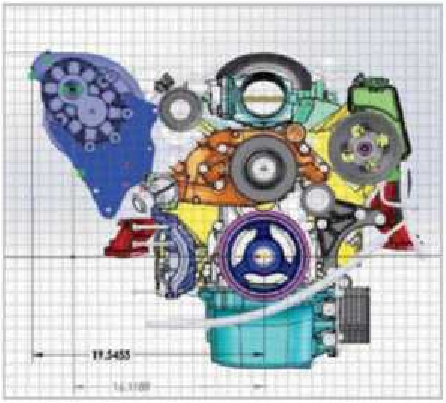
INTERCOOLER TECHNOLOGY

While **intercoolers** are built right into a roots blower's case, they're often optional in centrifugal supercharger kits. An intercooler is just a **core** (in centrifugal systems, it looks like a radiator) or a "**brick**" (found in roots systems, located inside the unit itself and utilizing a **heat exchanger** core mounted elsewhere). Intercoolers can be of an **air-to-air design**, where airflow passes over the intercooler or an **air-to-liquid design**, where a pump circulates liquid between the intercooler and the heat exchanger.

In theory, an intercooler's job is simple: take the hot, compressed air from the blower and turn it into cool, dense air before sending it to the engine, and exhibit virtually no pressure drop. But in reality, this job is very difficult: factors like engine bay and front end space constraints affect how large the core can be and

Weiand's 6-71 blower kits use two-lobe rotors for maximum boost at lower rpm. All feature a new case, end plates, manifold, and snout. Billet belt tensioner components and V-belt pulleys round out the package. Kits are engineered to produce 10-12 psi of boost on small-blocks and 5-7 psi of boost on big-blocks, but are a simple pulley change away from pump gas or hardcore racing. All superchargers are built in Weiand's state-of-the-art manufacturing cell, and each supercharger is 100 percent boost tested to help you squeeze out maximum power and efficiency.

Vortech Engineering's Universal LSX-Swap Supercharging Systems let you push the popular LS engine's power level even higher. The EFI systems are available in Standard (non charge cooled) or High Output (charge cooled) configurations, and with compressor options ranging from the 775hp-capable V-3 Si, to the 950hp-capable V-1 Ti, to the 1,200+hp-capable V-7 YSi. Depending on your application, you can expect a 30-50 percent power increase right out of the box—even with a reasonable safety margin. And if you run a modified engine with supporting modifications, there's much more power waiting to be unleashed.



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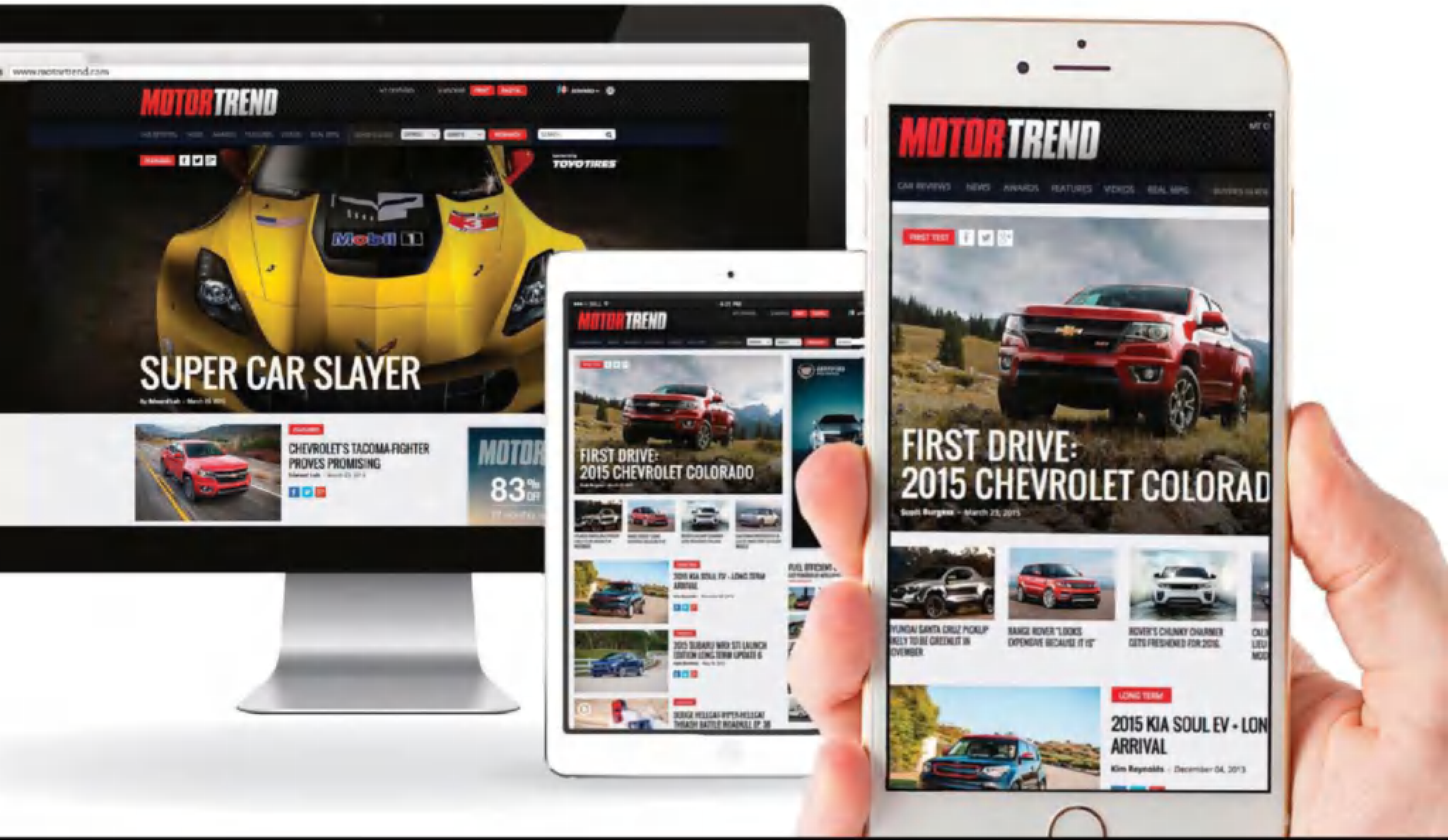
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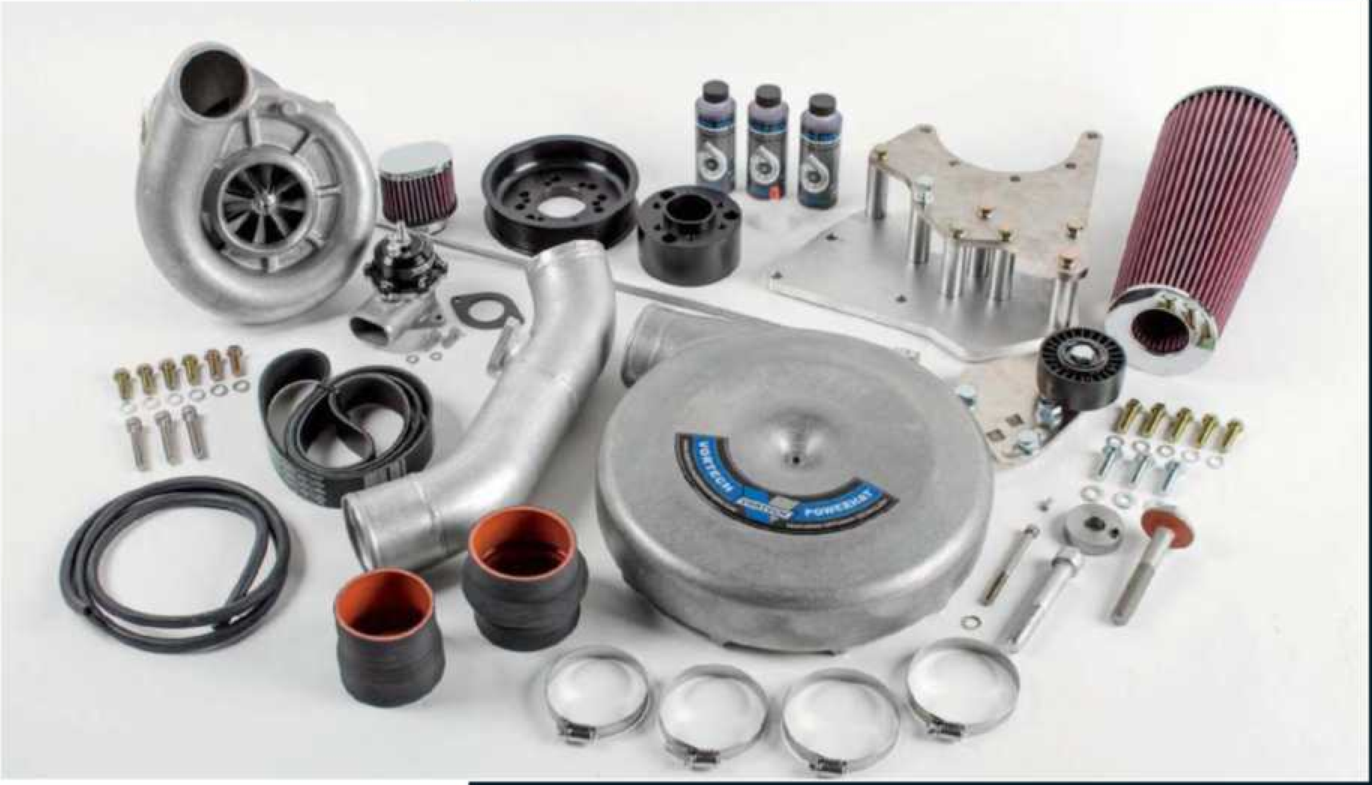


Vortech's LSX-Swap Kit for carbureted applications is similar to its EFI kit, and includes a V-3 Si-trim head unit with a 10-rib, 3.60-inch pulley, supercharger drive assembly, billet aluminum mounting bracket and 3/8-inch steel supercharger mounting plate, manual belt tensioner and 10-rib belt, billet crank pulley and spacer, air inlet filter, Maxflow Race Bypass Valve with filter, aluminum tubing and silicone hoses, and high-grade hardware with instructions. At the base boost level, this system will make 30-75 percent more power than stock—but actual power gains will depend on the engine size.

how much **piping** is needed, airflow considerations for both the intercooler and the radiator affect the core's mounting location, and the mounting location affects how many twists and turns the piping has to make.

While an intercooler is optional in some kits, we always recommend using them—especially if you run exclusively on pump gas. They will make the most power (or the same power at less engine-straining boost), and are highly effective in warding off engine-damaging detonation.

KIT CONSIDERATIONS

There are myriad factors to consider before purchasing a supercharger system. To make it less stressful, we offer the following advice:

One, decide if you're ready for the added complexity and cost of a supercharger. Yes, you'll be adding hundreds of horsepower, but you'll also be turning your docile daily driver into a rubber-burning, point-and-shoot missile that eats tires and drinks petrol by the tankful when in boost. Yes, modern blowers can return decent mileage with a light right foot, and they're as reliable as they've ever been. But they require more maintenance than a stock car and can send expensive drivetrain parts like clutches to an early grave—and don't kid yourself about driving responsibly with huge power! And if you ever decide to sell your ride, instead of commanding a premium for a stock car, you'll only recoup about a third of the cost of mods, and possibly scare off some buyers looking for a babied Vette that was "only driven to church on Sundays." Just a few things to think about.

A&A wasted no time getting a C7 kit together. It got the system installed in October 2013, and nailed down tuning on the tricky direct-injection LT1 by December 2013. This kit utilizes A&A's Ram Air Intercooler design: it features a functional, integrated airscoop that provides optimum intercooler airflow, while not impeding airflow to the radiator. The C7 bracket comes completely assembled, and can be installed on the engine in a matter of minutes. A&A includes a new "SFI Approved" balancer with interchangeable pulleys as standard with its kits. And because Vette owners expect an aesthetically pleasing look, you won't see any exposed welds or clunky-looking clamps here. And by the way, the standard kit can make just under 600 rear-wheel horses.

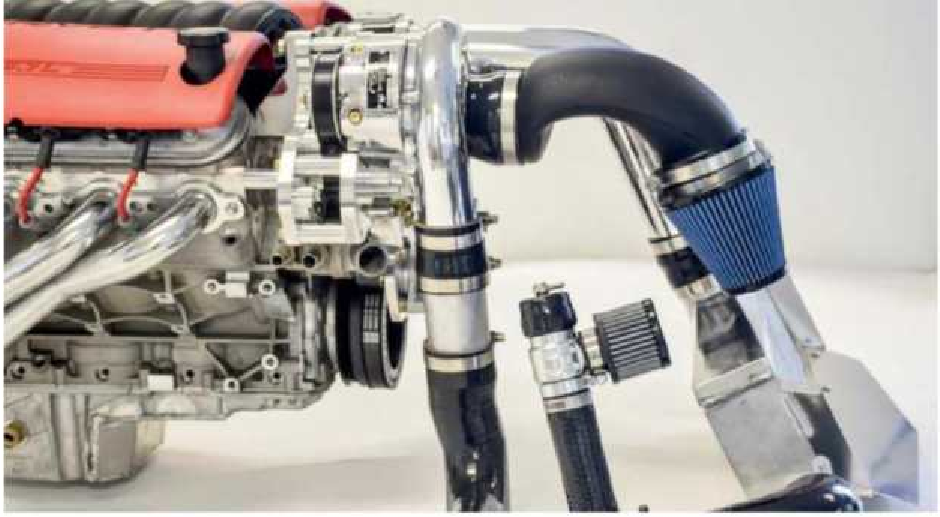
Two, decide on the type of supercharger: most enthusiasts will be doing lots of street driving and only minimal racing, so first think about how you use your car, and how you want to improve its performance. In general, roots blowers offer that instant-boost, instant-power feel, with less intense high-rpm power. And centrifugal blowers are a little softer down low, but build to intense mid-range and high-rpm power. We've driven both and love both, so if you don't have an immediate favorite yet, keep reading.

Three, if applicable, decide on which performance level you want. Some blower kits offer several "levels" to choose from. The base kit offers the standard head unit and boost level, along with components like the base bypass valve. The base kit is usually all-inclusive, and in many cases it is emissions-legal, too. Mid-level kits can include a bigger head unit, fueling upgrades, an air intake, and different pulleys and ECU calibrations for owners wanting to make more power. And top-level kits (sometimes referred to as "tuner kits") leave out fuel system pieces and tuning, and let you build and tune your blower system to your liking to make big power.

Four, research supercharger system prices, completeness, options, and any compromises that need to be made. As we just said, some kits are literally all-inclusive, including custom tuning and an upgraded fuel system, requiring no additional parts, and requiring no car mods like a replacement hood. But some kits require you to buy extra parts like an upgraded fuel system and to change or modify chassis supports, water pumps, steering racks, and hoods. And options like intercooling and head unit finishes can be considered, too. So be sure to research each kit: speak with each manufacturer's tech guys (or your local blower installer), and search popular message boards for information and feedback. This way you can get a bead on exactly what all you need. Look into if the systems have a warranty, and if so, for how long and how many miles. Then you can calculate each kit's price and compare them.

Five, make your choice. When ordering, be sure to have your VIN, year, model, and trim info handy, as some manufacturers use that to provide you with the correct system. Ask if the company offers an extended warranty for your system. If you plan on having it installed by a mechanic, get it scheduled and provide him with as much information as possible (like instructions) beforehand. And if you plan on installing it yourself, make sure that you have all of the necessary tools to do the job.

And Six, get that sucker installed, then go enjoy the joys of driving a forced-induction Corvette. Oh, and try not to fishtail it into a ditch, OK? These damn kids with their smartphone cameras are everywhere... **VETTE**



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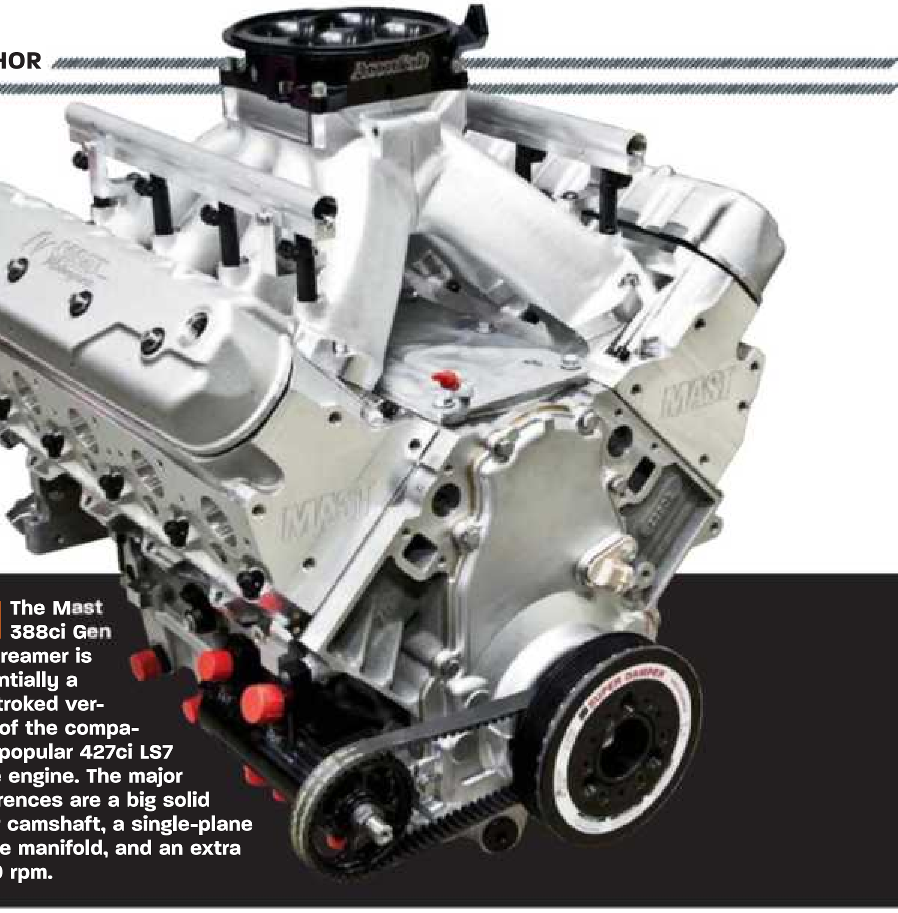
FLAT-PLANE THIS!

WHO CARES ABOUT FLAT-PLANE CRANKS? MAST MOTORSPORTS' 8,000-RPM LS SCREAMER CRANKS OUT 725 HP FROM JUST 388 CUBIC INCHES.

BY **STEPHEN KIM** • PHOTOGRAPHY BY **THE AUTHOR**



01 The Mast 388ci Gen IV screamer is essentially a de-stroked version of the company's popular 427ci LS7 crate engine. The major differences are a big solid roller camshaft, a single-plane intake manifold, and an extra 1,000 rpm.

Funny how it's usually the little dudes that insist that size doesn't matter. Let's call them the insecure midgets sitting in the corner. It's an interesting, perhaps delusional theory, but where would LeBron James and Ron Jeremy be without their impressive, um, physical attributes? Fortunately for little dudes, there's this thing called money. And fortunately for the small-displacement engines of the world, there's this thing called rpm. Just like a big stack of Benjamins adds several inches of perceived height in the eyes of the ladies, tach-straining rpm adds a big chunk of perceived cubic inches to any engine. Case in point: Mast Motorsports' 388ci LS screamer. Despite measuring just 12 cubic inches larger than a stock LS3 small-block, thanks to its ability to turn 8,000 rpm, it cranks out 725 horsepower. Yes, size matters, but so does rpm.

Sit back and chew on these numbers for a moment. Back in 1957, hot rodders wet their pants when the 283ci fuelie small-block Chevy hit the magical 1 hp per cubic inch mark. Now in 2015, this Mast 388 kicks out an astounding 1.86 hp per cube. That's within striking distance of the 1.91 hp per ci produced by the Ferrari F12, which just happens to pack the most powerful V-12 ever built by the Scuderia. Of course, horsepower per liter has always been the ricer's metric of choice. In that category, the 114.1 hp per liter churned out by the Mast 388 tops the Lamborghini Aventador (106.3), Audi R8 V-10 (105.8), and the Porsche 911 GTS (113.2). That's not too shabby at all for a primitive two-valve, pushrod engine going up against exotics pimpin' four and five valves per cylinder.

SMALL CUBES, BIG POWER

Elementary mathematics clearly illustrates why displacement and rpm are equally important. Since calculating horsepower involves multiplying torque by rpm, then dividing that product by a constant (5252), the only way to increase horsepower is by increasing torque or rpm. Simple enough. Larger engines have the distinct advantage of producing more torque than a smaller engine, even if both are equipped with identical cylinder heads and camshafts. If two hypothetical engines—a big one and a small one—turn the same maximum rpm, yet the larger engine produces more torque, then the larger engine will produce more horsepower. This is precisely why all race organizers on earth enforce rules that limit maximum displacement or provide weight breaks for cars opting for smaller engines.

On the flip side, a smaller-displacement engine can make up for its lower torque output by multiplying that torque by more rpm. This explains how the previous generation of 18,000-rpm Formula One V-8s achieved similar hp output (750-800) as the current generation of 9,000-rpm NASCAR Sprint Cup V-8s despite having less than half the displacement (2.4L vs. 5.8L). That's obviously a rather extreme example, but a quick glance inside Mast Motorsports' crate engine catalog reveals a more suitable comparison. The company's LS7 427 SS offering measures 39 cubic inches larger than the 388, but comes equipped with the same Black Label 285cc cylinder heads. Not surprisingly, the 427 produces 573 lb-ft of torque to the 538 lb-ft produced by the 388. As a result, the 388's smaller displacement requires turning an additional 900 rpm (7,400 vs 6,500) before reaching peak power.

Here's where things get interesting. The Mast 388 actually produces a substantial 75 horsepower more than the company's bigger 427ci small-block. To take advantage of the deep-breathing potential of Mast's Black Label LS7 cylinder heads, the 388 benefits from a larger 264/274-at-0.050 solid roller camshaft compared to the 427 SS's 246/260-at-0.050 hydraulic roller. The 388 also boasts more valve lift—0.776/0.756-inch versus 0.659/0.666—to further increase airflow into the cylinders. The 388 also utilizes a tall single-plane intake instead of the conventional composite intake found on the Mast 427 SS. The combination of a larger intake, longer camshaft duration, higher valve lift, and the faster valve opening rate inherent to the solid-lifter cam lobe design extends the rpm range of the powerband while also increasing torque output.

Although the smaller engine in this scenario does in fact make more power than its larger counterpart, concluding that a small-displacement, high-rpm combo is inherently superior based on this example alone is absolute nonsense. In this case, the 388 tops the 427 in the hp department due primarily to its larger camshaft and freer-flowing intake manifold. With the same intake, camshaft and matching valvetrain hardware, the 427 would produce more torque and similar horsepower numbers as the 388, but at lower rpm. In theory, since the 427 measures roughly 10 percent larger than the 388, it could turn 10 percent fewer rpm (6,660) and still achieve similar peak horsepower, thus decreasing stress on the valvetrain and rotating assembly.

ROAD COURSE DNA

Obviously, Mast's standard 427 SS crate engine and its custom solid-lifter 388 prove that there are two ways to skin a cat. Nevertheless, even if a smaller engine can make just as much power as a larger engine, what's the point of turning more rpm if it increases stress on engine internals and sacrifices torque? The answer is one part pragmatism and two parts hooliganism.

This particular custom Mast 388ci combination is destined for a Pro Touring C3 Corvette built by Detroit Speed and Engineering. Although Kyle Tucker and the crew at DSE have plopped countless 427- and 454ci Mast Gen IV small-blocks into Camaros and Chevelles, they felt that a small-displacement, high-rpm combination better suited the lightweight C3's persona. "Kyle approached us at PRI 2014 about building a custom engine package that was a bit different from the norm. He wanted a high-rpm motor that made 700 hp at around 7,500 rpm," Joel Iles of Mast Motorsports recalls. "He wasn't too concerned about hood clearance, so that gave us the flexibility to go with a single-plane intake manifold and a 4500-style throttle body. Kyle wanted the motor finished in a quick timeframe. When we stopped by the Callies booth, they said they had a 3.625-inch crank in stock, so the project came together from there."

Thanks to legendary big-blocks like the 454 LS6 and 427 ZL1, hot rodders are hardwired to lust after big cubic inches. While massive torque output may suit the needs of a two-ton street/strip Chevelle just fine, the road-course-bound DSE C3 has different priorities. Destined to compete in Ultimate Street Car Association events, which involve delicately modulating the throttle on the autocross and road course, epic heaps of low- and mid-range torque can make it difficult to apply the power on corner exit. Since the Mast 427 measures 10 percent larger than the 388, if equipped with the same solid-lifter cam as its smaller counterpart, it would produce roughly 10 percent more torque (597 lb-ft). That's

02 **The factory GM LS7 block has been decked to 9.230 inches and finish-honed to a final bore diameter of 4.130 inches. After align-honing the stock main caps, the block was ready for assembly.**

03 **The 388's shorter stroke allows for the use of 6.350-inch Callies Ultra I-beam connecting rods that are slightly longer than the 6.125-inch units found in Mast's standard 427 SS crate package. This yields a higher 1.75:1 rod-to-stroke ratio versus the 427's 1.53:1 ratio, resulting in reduced side loading on the cylinder walls.**

04 **Although the benefits of a higher rod-to-stroke ratio is a topic of profuse debate, longer rods do in fact push the wristpins closer to the piston crown. This reduction in compression height nets a decrease in piston weight. With a 1.080-inch compression height, the custom Diamond pistons check in at 473 grams each.**

05 **One of the downsides of decreasing the piston-swept volume of a cylinder is that it also decreases the compression ratio. To compensate, the Diamond pistons feature a 7.2cc dome.**

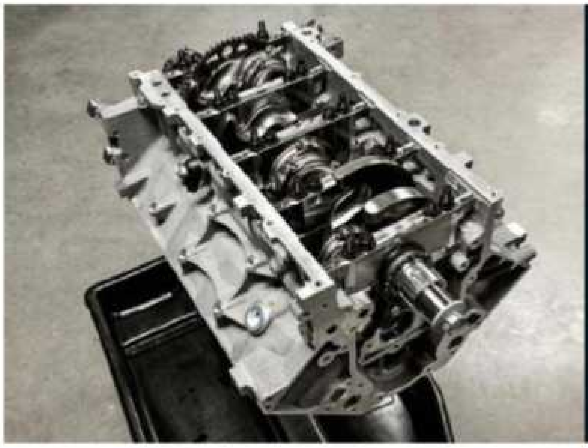
06 **Sealing in the cylinder pressure are standard-tension Total Seal AP 0.043-inch top rings, 1.5mm Napier second rings, and 3mm oil rings. The top and second rings have been gapped to 0.020- and 0.018-inch, respectively.**

not necessarily a good thing when cornering grip is at a premium. Furthermore, extending the powerband by an additional 1,000 rpm can potentially eliminate time-wasting shifts. While a more manageable torque curve and an extended rpm range offer practical advantages, the visceral thrill of winding the tach out and listening to the engine scream at 8,000 rpm is pure hooliganism at its finest.

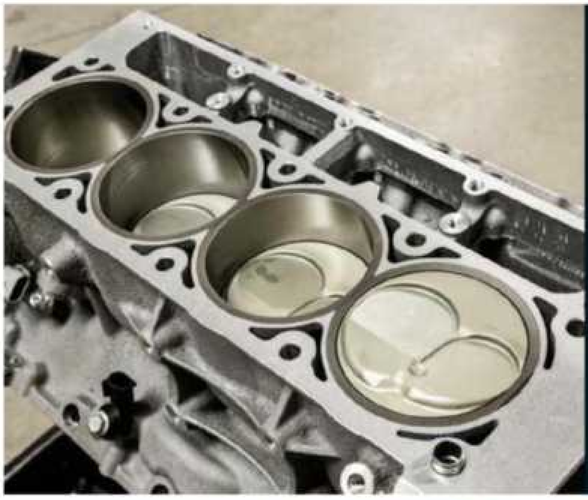
OVER-SQUARE ADVANTAGE

In any form of racing where sanctioning bodies ban power-adders and impose cubic inch limitations, over-square cylinder dimensions reign supreme. In these classes, engine builders will typically make the bore diameter as large as the block's bore spacing and cylinder wall thickness will allow, then set the stroke at whatever length is necessary to meet the cubic inch limit. For example, 500ci NHRA Pro Stock engines utilize a massive 4.750-inch bore and a very short 3.520-inch stroke. In addition to decreasing piston speed—and therefore friction—compared to an under-square engine of the same displacement, the big-bore, short-stroke architecture creates more room inside the cylinders for larger valves. Furthermore, increasing the distance between the cylinder wall and valves helps de-shroud the valves for enhanced airflow.

But wait, there's more. "In addition to reducing piston speed and friction, a short-stroke crank has less windage because the counterweights are smaller and the outside edge of the counterweights are closer to the crankshaft



07 The premium-grade Callies Magnum 3.625-inch crankshaft is forged from 4340 steel and boasts gun-drilled mains and profiled counterweights to reduce mass. They're affixed to the block with factory LS7 billet main caps. With a shorter stroke than a stock LS7, clearancing isn't required.



08 To achieve the desired compression, Mast set the piston deck clearance to "0.012-inch out of the hole." When combined with 69cc combustion chambers and 0.051-inch Cometic MLS head gaskets, the compression ratio checks in at 12.0:1.

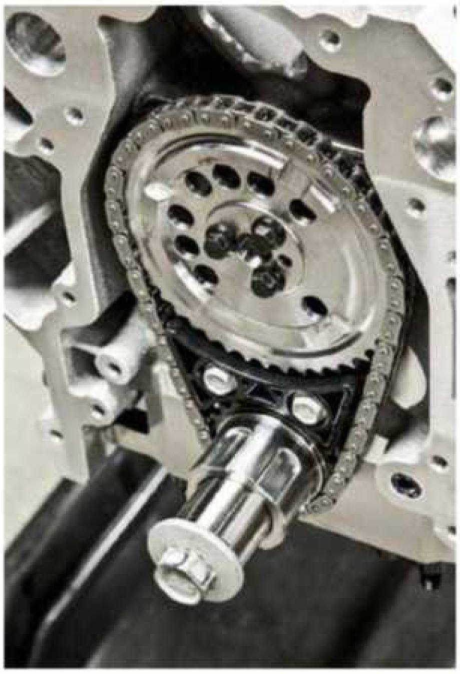
09 Actuating the valves is a custom Cam Motion 264/274 at 0.050 solid roller camshaft with 0.776/0.756-inch valve lift. Its additional 18 degrees of intake duration and extra 0.117 inch of lift over Mast's standard 427 SS cam accounts for much of the 75 horsepower difference between the two engines.

centerline. This also reduces rotating mass," Mast's Joel Iles explains. "Using longer 6.350-inch connecting rods also allows a reduced compression height of the pistons, which reduces reciprocating mass. The result is a faster-revving engine. The torque curve of this engine is insane. It doesn't peak until about 5,700 rpm, but it stays flat all the way to 7,600 rpm."

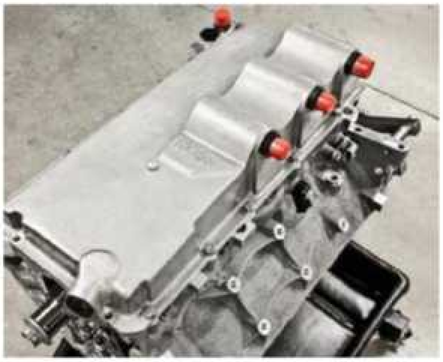
Since there is no cubic inch limit in the classes DSE will be racing its Corvette in, Mast was free to decrease stroke length (and therefore displacement) to whatever provides the best compromise between mid-range torque and high-rpm horsepower. With a torque curve that hits hard after 5,000 rpm, and a power curve that keeps on chugging past 8,000 rpm, Joel Iles and the Mast Motorsports crew have successfully built a race engine that will help the DSE Corvette put the power down out of corners and haul ass down the straights. **VETTE**

Mast 388ci LS7

RPM	TQ	HP
4,600	465	408
4,700	419	418
4,800	473	432
4,900	480	448
5,000	486	463
5,100	493	478
5,200	499	494
5,300	504	509
5,400	511	525
5,500	523	548
5,600	533	569
5,700	**538**	584
5,800	**538**	594
5,900	533	598
6,000	524	599
6,100	516	600
6,200	511	603
6,300	509	610
6,400	511	623
6,500	515	638
6,600	519	652
6,700	522	665
6,800	524	678
6,900	525	690
7,000	525	700
7,100	524	709
7,200	523	717
7,300	520	723
7,400	515	**725**
7,500	506	722
7,600	492	713
7,700	477	700
7,800	466	691
7,900	454	683

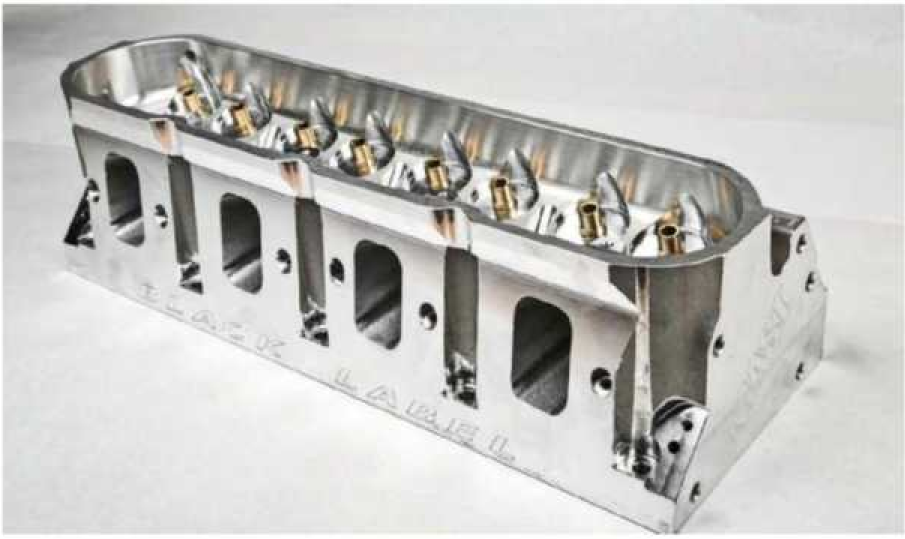


10 **A Cloyes single-roller timing set keeps valve timing precise amidst the immense valvespring pressure required by the solid-lifter cam. Mast advanced the camshaft to a 106.5-degree installed centerline to help recover some of the low- and mid-range torque sacrificed by the engine's small displacement.**



11 **An absolute must for any serious road race machine, the Mast 388 features an ARE dry-sump oiling system. The OE-quality pan has three suction stages and one feed stage. Dry-sump systems not only make it nearly impossible to oil-starve an engine during high cornering and braking loads, but they also produce enough crankcase vacuum to improve ring seal and increase power.**

12 **The LS7's unique factory dry-sump system uses an internal pump. Converting to an external pump requires plugging up the factory oil passages to prevent massive internal oil leakage.**



13 **Mast's Black Label LS7 cylinder heads feature 285cc intake ports, 69cc combustion chambers, and rugged 0.750-inch-thick decks. At 0.700-inch lift, the heads move 395 cfm through the intake ports and 249 cfm through the exhaust ports.**

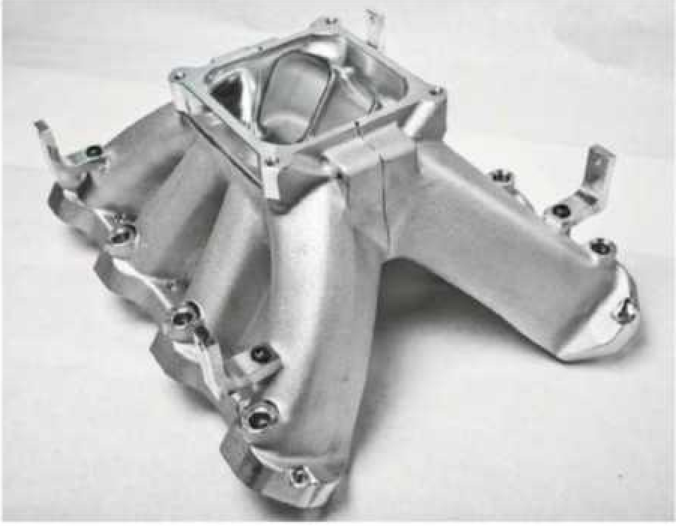
14 Due to the high-rpm life the 388 is destined for, Mast upgraded the standard stainless steel valves to 2.200-inch titanium intake valves and 1.600-inch Inconel exhaust valves. Just like the pistons, the valves must completely reverse direction as they open and close. As such, in a high-rpm race engine, every gram of weight savings on the "valve side" of the rocker arm helps improve valvetrain durability.

15 Ensuring that the lifters stay put on the cam lobes are PAC 1.550-inch valvesprings that provide 258 psi of seat pressure and 658 psi of open pressure. They're held down by PAC titanium retainers and locks.

16 On the "pushrod side" of the rocker arms, saving weight is secondary to reducing valvetrain flex. Consequently, the Mast 388 utilizes Isky Red Zone 0.842-inch solid roller lifters and 6.925-inch-long Smith Brothers tapered 7/16-inch pushrods.

17 After installing the factory timing cover and ATI Super Damper, the heads were torqued down to 80 ft-lb. Cometic MLS head gaskets seal the combustion chambers while ARP head studs keep the heads clamped down securely.

18 While the standard Mast 427 SS can make do with factory stamped rocker arms, the stress created by the additional spring pressure and rpm of the solid-lifter 388 are best handled by T&D shaft-mount 1.8:1 rocker arms. The lash was set at 0.020 inch.

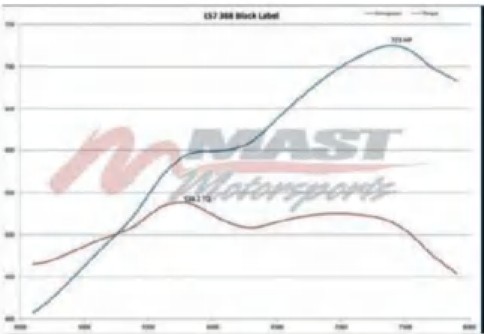


19 Compared to a factory-style composite intake manifold, the single-plane Mast LS7 unit boasts a 4500 flange and a substantial increase in runner length, runner volume, and plenum volume. The big plenum boosts top-end power while the long runners enhance low-end torque.

20 The trick, two-piece design of the Mast intake allows CNC-porting and hand-blending of the otherwise-hard-to-reach plenum and runners. The driver and passenger sides of the intake are held together by through-bolts located on the bottom side of the plenum.

21 An anodized Accufab throttle body feeds 2,000 cfm of air into the hungry 388. For EFI compatibility, it includes a TPS and an IAC valve.

22 A set of 60 lb/hr injectors provide the fuel supply for the Mast 388. They're affixed to the intake manifold using custom Mast fuel rails.



23 With a Mast M-90 ECM controlling the fuel and spark, the 388 kicks out 723 hp at 7,400 rpm and 538 lb-ft at 5,700 rpm on Mast's Superflow dyno. The super-efficient Black Label cylinder heads need just 24 degrees of ignition advance.

Sources

ATI PERFORMANCE PRODUCTS
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SHOCK AND AWE

VIKING PERFORMANCE WALKS US THROUGH A COMPLETE INSTALL OF CRUSADER COILOVERS ON A C5

BY **STEVEN RUPP**
PHOTOGRAPHY BY **ROBERT MCGAFFIN**

When it comes to the handling personality of your Corvette, nothing has a greater effect than shocks. Yeah, sticky tires can help, but shocks are what really determines how your car handles, rides, and launches. There are many variations out there, including monotube, twin-tube, single-adjustable, double-adjustable, triple-adjustable, and so forth, but within each category there are vast differences in the offerings being sold. Cost is another area of wild swings with prices ranging from a few hundred to thousands of dollars.

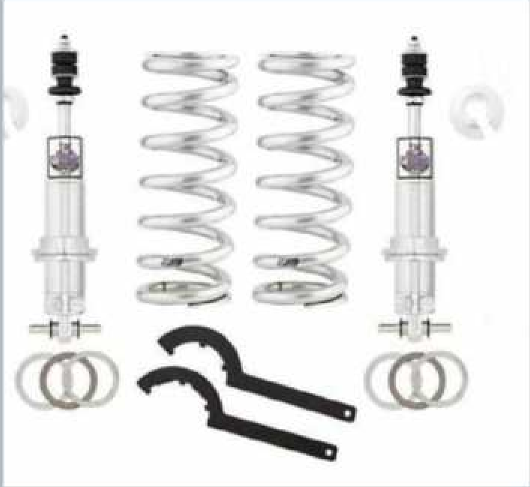
A shock's function is to control the timing of a car's suspension. This is accomplished, mainly, by the internal valving that tells the shock how much resistance is needed or desired to extend (rebound) and collapse (compression) the shock absorber. This is important since different vehicular activities demand different shock personalities and that's where adjustability comes into play. For example, a "quality ride" down the road would call for low compression and rebound settings while autocross would want the shocks set much higher for both. Shocks are even important in non-handling events like drag racing since they can greatly help with weight transfer for maximum rear tire bite. Here, the fronts, in general, would have high compression and low rebound while the rears would be set to the opposite. However, when dealing with an independent rear suspension, the goal will be to minimize rear-end squat, as squat will lessen the tire contact patch, resulting in less traction, assuming that the alignment wasn't altered to account for a certain degree of rear squat.

Having adjustable shocks lets your car switch between street, handling, and drag with just the clicking of a couple of knobs. In a single-adjustable shock, one knob changes both compression and rebound; better than nothing, but it's a system built on the word "compromise." A double-adjustable shock lets you dial in compression and rebound independent of each other and, for any sort of meaningful suspension tuning, this is the way to go. Other shocks, like triple-adjustable,

adds the ability to dial in high- and low-speed compression and rebound in even greater specificity. Of course, you really need to know what you're doing to get things dialed in "right" due to their complexity. It's absolutely critical to understand what shock forces are necessary for a particular application. As Chris King stated, "This is an area where the manufacturers need to do a better job educating their customers. For example, an individual may make the assumption that a four-way adjustable shock will perform better just because it's much more expensive and has two additional adjustment knobs. However, if the four-way adjustable shock actually makes less overall force than a double-adjustable, the customer will actually hurt the overall performance of the vehicle. That turns into a very expensive lesson."

Viking Performance started in early 2011, so they are relatively new players, but their team has over 50 years of hands-on experience in racing and performance aftermarket. They feel that their line of Warrior and Crusader double-adjustable shocks are a great balance of performance and cost. The newest line, the Crusader, was designed for more serious hard-driving applications. As Viking's Chris King relayed, "This shock was developed based on requests from the Pro Touring market and from small tire, drag radial customers. With these vehicles, there are situations that require rebound forces in excess of what standard passive adjustable shock absorbers can provide. The other factor in our design parameters was the frustration that adjustable shocks, in general, are too complex for the average person to be able to rebuild and/or revalve. From these requests, the Crusader was born. These shock absorbers have the same digressive compression valving, and various options thereof, as the Warrior line. As such, there are 19 positions of evenly spaced adjustments, the zero position and 18 distinctive clicks. The rebound valving, however, is a progressive valve that is strictly determined via orifice control. A progressive valve shock will have a softer low speed force that ramps up very quickly as shaft speed increases."

Within the Crusader line, Viking also offers a Pro Touring option, which incorporates more adjustment points and has much more aggressive compression settings. Viking only makes double-adjustable shocks because, in their opinion double-adjustables, if done right, gives the performance driver enough control to really get their suspension dialed in without the expense and tuning hassles of exotic triple-adjustable shocks or the compromises of single-adjustables. For this install we had a yellow C5 Z06 that was in need of better handling. It already had coilover shocks, but they were non-adjustable, so the owner was stuck in terms of suspension tuning other than setting ride height. The ability to set compression and rebound should lead him to faster lap times, which is always a good thing. **VETTE**



01 **As Viking's Chris King told us, "Don't let the progressive definitions fool you, as these shocks can generate huge forces at low speeds depending on the needle and seat combination. In fact, the Crusader shock absorber produces forces far greater than nearly all other shock absorbers on the market. The rebound side has 22 available positions of adjustments, the zero position and 21 distinctive clicks. As a result, the Crusader line provides for 418 different valving combinations. This needle and seat combination allows for a very large adjustment range. For example, our Pro Touring-specific valving has a range of 15 pounds to 850 pounds at 1-inch per second, 40 pounds to 2,000 pounds at 3-inch per second, and 120 pounds to 3,200 pounds at 6-inch per second. You will not find anywhere near this broad of an adjustment range with high-end monotube shocks."**

02 **To prep the shocks for assembly we gave the lower areas a good slathering of antiseize. Failing to do this will make it difficult to adjust the ride height, especially once they've been on there for a while.**

03 **The lock ring was the first to go on (shoulder facing up) and we ran it down to the last threads. As the lock ring passed through the antiseize it pulled some down and coated the remainder of the threads. We then ran down the spring nut (shoulder up) until it was close to the lock ring.**

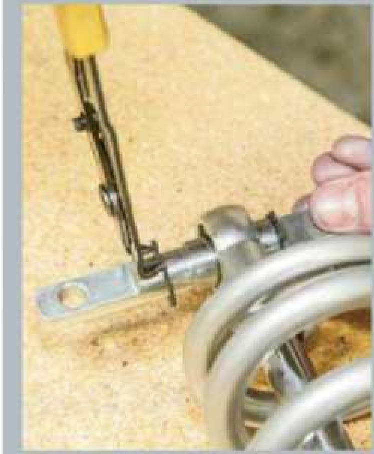
04 **Two washers and a thrust bearing were in the kit. All were given a coating of antiseize and the thrust bearing was sandwiched between the two stainless washers. By now you'll be sick of antiseize since it gets everywhere.**

05 **The antiseize-coated thrust bearing sandwich was then slid over the shock and onto the spring ring.**

06 Next up, we slid the 500-pound Viking spring onto the shock body. The springs are made in the USA, weigh in about 25 percent lighter than many other springs on the market, and carry a lifetime warranty to stay within 2 percent of their original free height and rate.

07 We then started assembling the rear coilover shocks. The procedure was the same as the front and involved more, you guessed it, antiseize. The rear Crusader coilover shocks, like the fronts, were double-adjustable. "Another important characteristic of the Viking shocks is that every click of the adjuster makes an actual change of the force output. While this seems like a no-brainer, there are many high-end shock absorber brands that do not change the force output until 12 clicks or more of the adjuster, which makes tuning on the car difficult. Another cool feature to these shock absorbers is the interchangeable needle and seat design. The rebound valving adjustment range can be changed without completely disassembling the shock absorber. With the shock in a vice, on its side, in the fully extended position, the rebound knob can be taken off and the needle removed with basic tools and the seat changed out with a flat-head screwdriver. There are no expensive 'special tools' required to be purchased from Viking. The process is similar to jetting a carburetor. Obviously, it is critical that everything be kept extremely clean, since the orifices are very small. The end user can choose from a variety of progressive force ranges and Viking has developed application specific valving for drag racing and Pro Touring (handling) applications. Multiple other valving ranges are also available," explained Viking's Chris King.

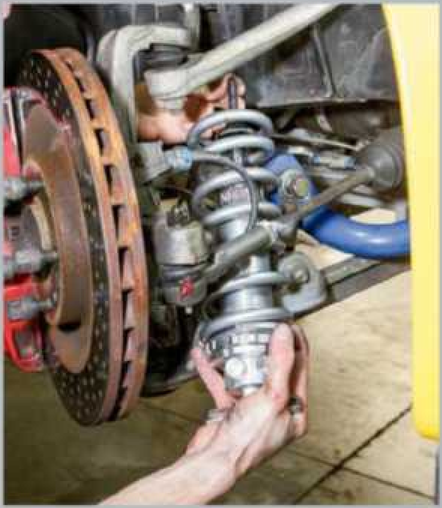
08 The rear shocks received 600-pound Viking springs. We went with heavier rear springs, as the angle on the shocks is greater in the rear of a C5, resulting in a higher spring rate requirement. In addition, we wanted to have a heavier rate in the rear to minimize rear-end squat.



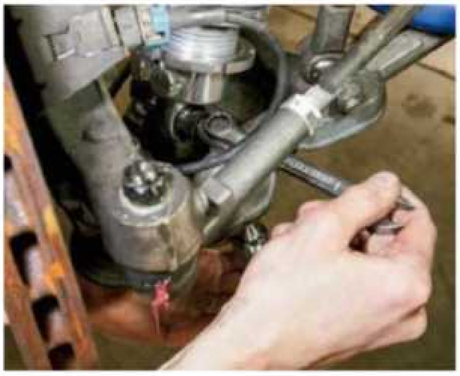
09 Unlike the front shocks, the rears required the installation of T-bars. With one of the supplied snap rings already installed on the upper T-bar we slid the T-bar through the upper bearing mount and secured it with a second snap ring. We double-checked to make sure the snap rings were securely located in the grooves of the T-bar. The T-bar mount is unique to Viking. Chris King explained, "We feel it's a better solution as it allows for maximum shock travel since an added bracket, as many other shock companies supply, actually results in a shorter shock to account for the lost height due to the bracket. In addition, the T-bar has an offset that moves the upper shock mount toward the center of the vehicle, which allows for added spring clearance. The T-bar is also universal, so the end user doesn't need to worry about a left- or right-hand specific part."

10 With the front and rear Viking shocks assembled we could go about removing the old parts. Our C5 already had a set of non-adjustable coilovers installed so the procedures were a bit different than a stock C5. Using an open-ended wrench and an Allen wrench in the end of the shock stud (to prevent the piston rod from rotating) we loosened and removed the stud nut, washer, and bushing. We then removed the two lower bolts securing the T-bar to the lower control arm. With that done we removed the old shock from the car.

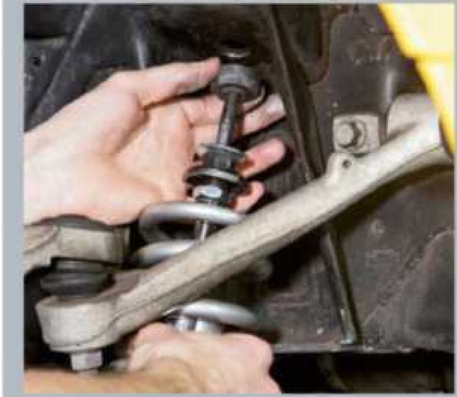
11 Since our C5 already had coilover shocks, the transverse leaf springs had previously been removed. If you're starting with a stock C5 you'll need to remove the front and rear leafs. The process is pretty straightforward with the leaf springs held in place by two brackets on each leaf and endlinks on the end of each leaf.



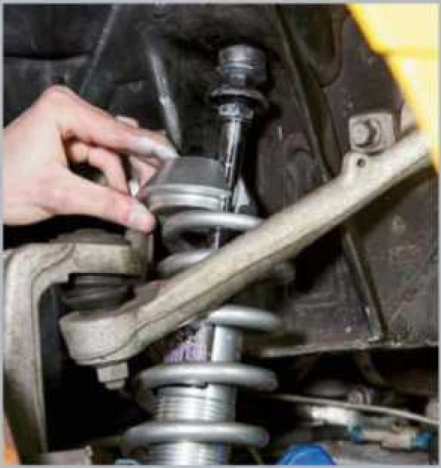
12 The new double-adjustable Viking shock assembly was carefully slid up between the control arm and tie rod until it was in place. It's a bit tight, so if you want more room you could disconnect the outer tie rod from the spindle.



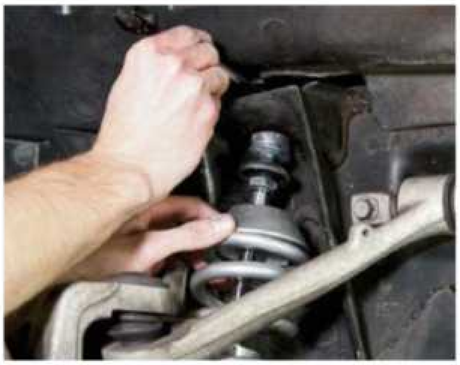
13 With the T-bar resting on the lower control arm we lined up the holes and secured it in place with the factory nuts and bolts. Viking utilizes an upgraded bearing T-bar mount that allows for misalignment and is a better overall solution since the weight of the vehicle is on stainless steel instead of polyurethane.



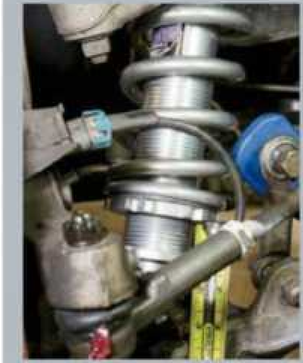
14 One washer and bushing were installed on the top of the stud with the washer orientated so that it "cupped" the bushing. Also, the larger shoulder on the bushing was installed facing up so that it could lock into the factory upper shock mount.



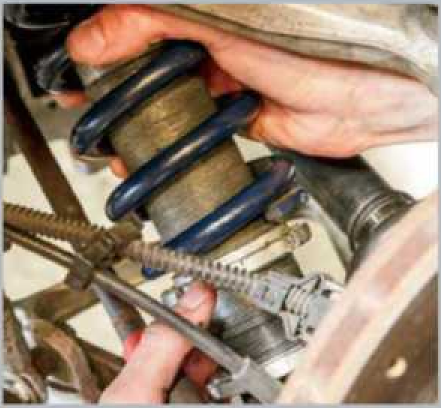
15 The shock was then extended until the stud passed through the shock tower. Once there, we installed the spring cap and let it rest on top of the coil spring.



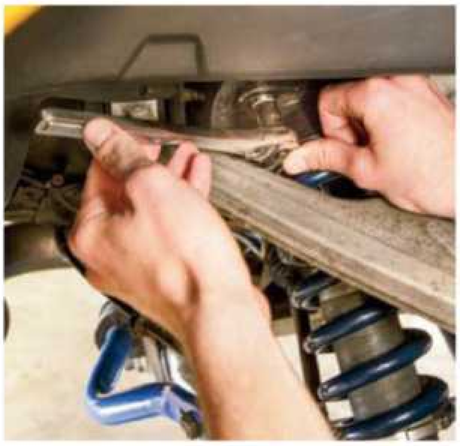
16 We could then secure the shock with the upper stud nut and locknut, making sure the rubber bushings compressed adequately. A good way to know is that the bushings should be approximately the same diameter as the adjacent washers.



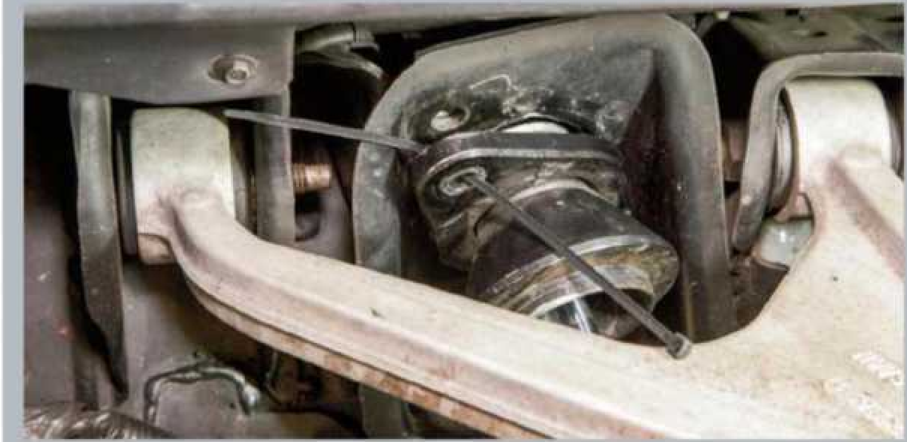
17 The upper spring cap was raised, along with the coil spring, so that the spring nut could be spun upwards to support the spring. To get in the ballpark for the ride height we adjusted the nut up about 1/3 of the way from the bottom of the threads. When we did the install on the other side of the car we made sure the measurements were the same.



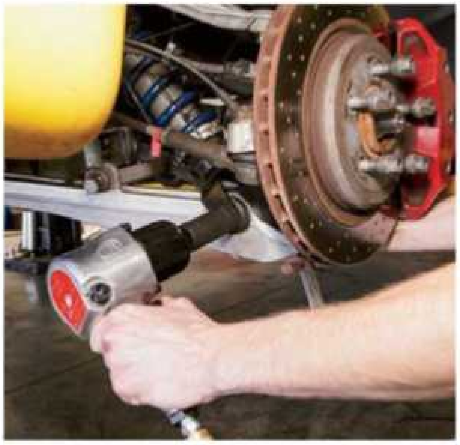
18 Moving to the rear of the Corvette, we started removing the rear shocks. Using some spanner wrenches we loosened the lock nut to take pressure off of the spring.



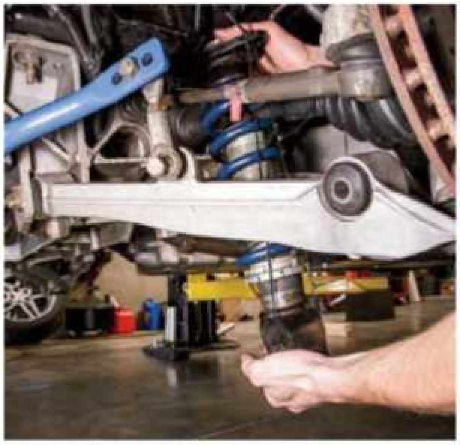
19 We used a jack to lift the rear lower control arm a bit to make removing the upper mounting bolts easier. If you don't do this, the upper shock mount will try to pull away from the shock tower when loosening the bolts, this can damage the threads.



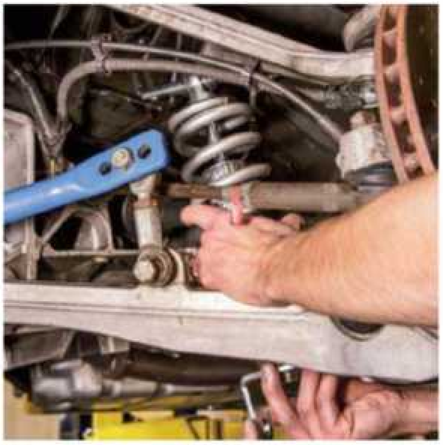
20 With the jack removed from under the lower control arm, we ran zip ties through one of the holes of the upper shock mount and around the lower mounting bracket. We then raised the lower control arm to compress the shock and tightened the zip ties. This caused the shock to remain compressed, allowing for easier removal. This step is only necessary because the shock being removed was a pressurized monotube design, and was too large to remove in its extended state. Stock shocks should come out without this step.



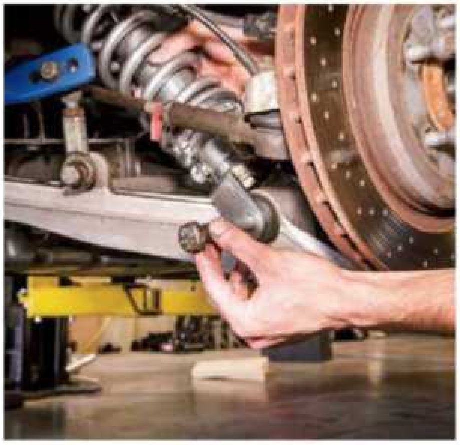
21 Using an impact wrench, we loosened and removed the lower control arm mounting bolt.



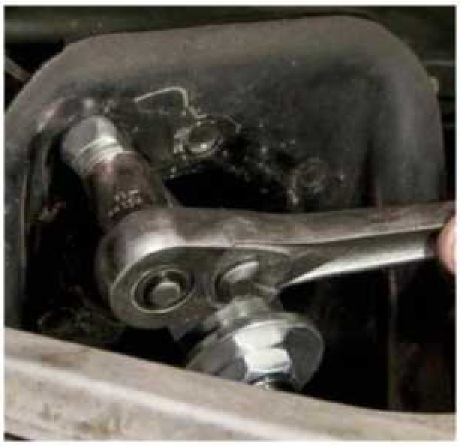
22 We then removed the old non-adjustable shock by sliding it down through the control arm.



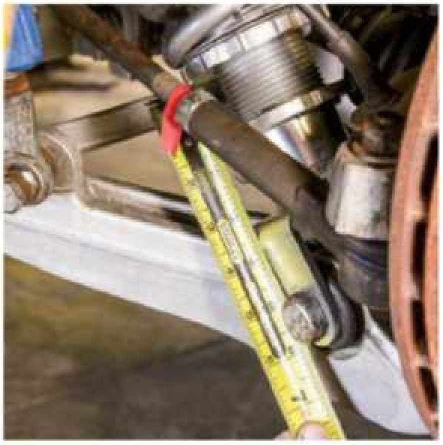
23 The new double-adjustable Viking assembly (compressed) was then slid into place in the reverse way we removed the old shock.



24 The lower mounting bolt was slid through the lower control arm bushing to secure the shock. We also made sure that the two adjustment knobs were facing toward the center of the Vette.



25 The shock was then extended until the upper T-bar contacted the upper shock tower. Once there, the holes in the T-bar were lined up and secured with the factory bolts and torqued to spec along with the lower mounting bolt.



26 Like the fronts, we started out with the spring nut adjusted about 1/3 of the way from the bottom threads on the shock, making sure each side were the same. Once we have the ride height dialed in we will use spanner wrenches to tighten the locking rings.

SETTING RIDE HEIGHT

The ride height of a vehicle is adjusted by lowering or raising the spring nut on the shock body. Prior to removing any suspension components, measure and record the distance from the ground to the bottom edge of the wheel arch at each corner. Based on your desired outcome (maintaining the existing ride height, lowering the ride height, or raising the ride height) compare these measurements before and after installing your coilover shocks. If the new ride height is higher than desired, incrementally lower the spring nut on the shock body until the desired ride height is achieved. If the new ride height is lower than desired, incrementally raise the spring nut on the shock body until the desired ride height is achieved.

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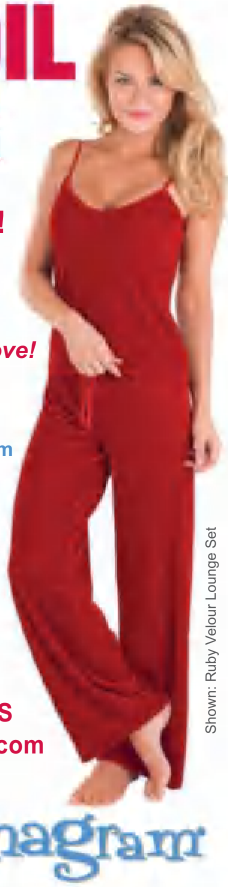
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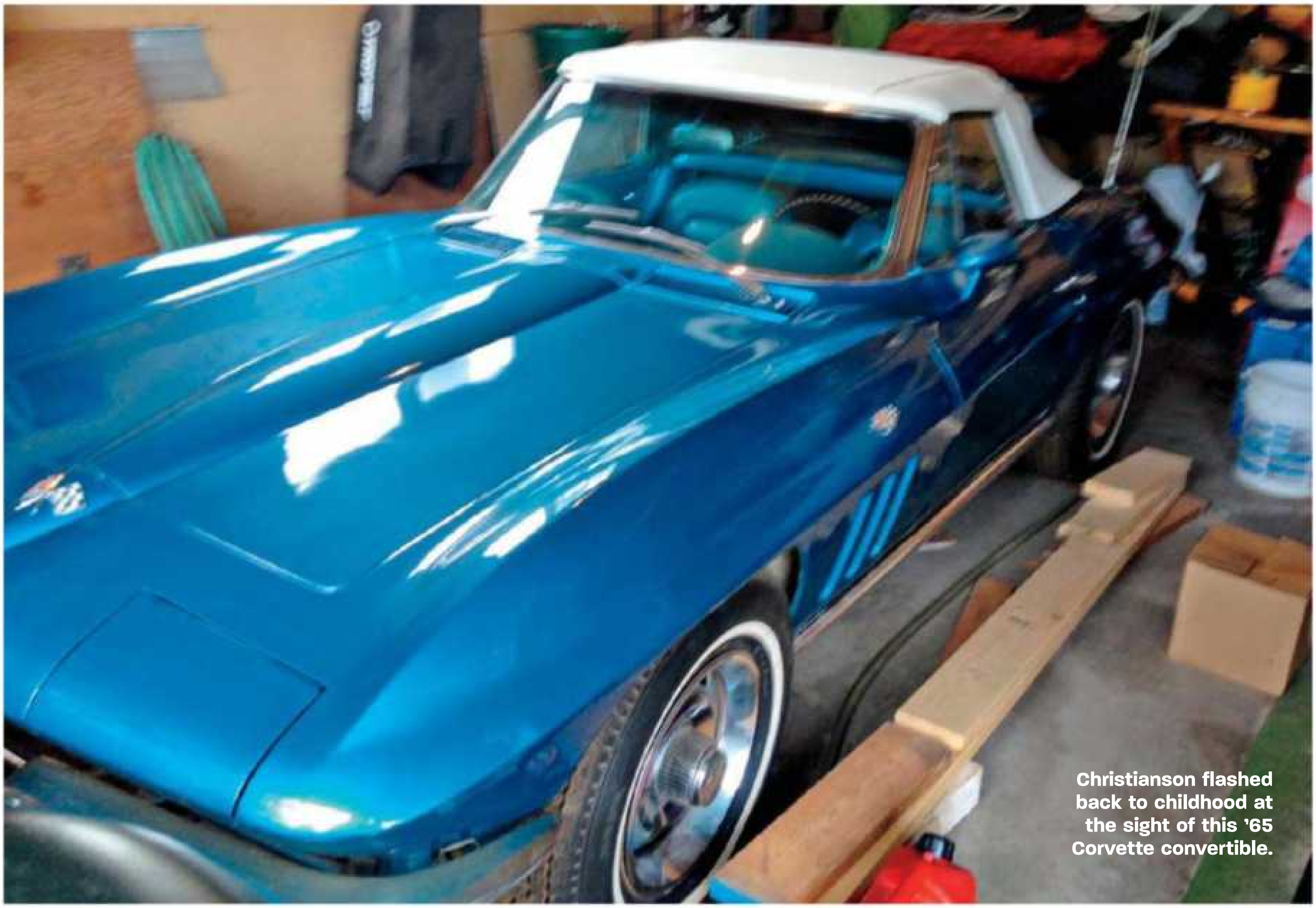

Christianson flashed back to childhood at the sight of this '65 Corvette convertible.

HE FLASHED BACK TO CHILDHOOD THE SECOND HE SET HIS EYES ON THE '65 VETTE

In 1975, when Rory Christianson was 10 years old, a 1965 Corvette convertible, owned by Bob and Wendy Airey, would pass him on his walk to grade school every morning in the little town of Stettler, Alberta, Canada. Christianson remembers the sound of the gears grinding in the four-speed. This '65 became his dream car.

"Growing up, I was always into cars," Christianson said. Forty years passed. Christianson now had a successful car business named Passion Customs & Accessories, right there in Stettler. Likewise, the Aireys still owned that very same '65 Corvette convertible that Christianson wanted when he was 10 years old. They still lived in Stettler.

Boyhood dreams die hard. As an adult, Christianson still felt a child's passion for this Nassau Blue '65 Vette. "I kept track of the car all these years." Christianson knew the Aireys; Stettler is a small town. Finally, six to seven years ago, Rory told Bob "to keep me in mind when you are ready to sell." Bob Airey wasn't ready yet. More than one enthusiast had approached him about selling his Nassau Blue convertible, but the sharp little Corvette had become almost like a member of their family.

"One day he got hold of me and said, 'I'm ready. You better come and have a look at it.'" Christianson didn't dally. In October 2014, he went over to inspect his childhood dream car, now a 59,000-mile unmolested original with one repaint, and powered by a

Rory Christianson (right) shakes hands with Bob Airey in the garage where the car sat for decades.

The interior was in good condition. Now, Rory can grind on the gears and make the sound he heard when he was 10 years old while walking to school.

The body had one re-spray to its original Nassau Blue.

The 327-cubic-inch V-8 was original with 59,000 miles.

350-horsepower 327 with a four-speed. The car had few options past power disc brakes and a soft top. Although Rory's passion still burned, real world details proved a bit of a wake-up call.

"When you are a kid, the car driving by is like perfect and the nicest car in the world. But when you see it later in life as a restoration you see dried-out seals, and a motor that the valve covers had to be leaking for years."

Yes, the Vette needed a restoration. It had been sitting two decades, so the battery was dead, carburetor gaskets dried out, fuel lines rotten, and more. Christianson still deemed this buying opportunity like a dream. He flashed back to childhood the second he set his eyes on the '65 Vette. Over the years, he had told so many people – "my kids and guys that work for me" – about this Vette. So to actually end up with the car was kind of like a dream. The money, however, wasn't a dream.

"I'd already made some other commitments for investments, and the money to buy it wasn't pocket change." But, Christianson could not pass up the opportunity. Plus, Bob was "so good to deal with." He never advertised the car. Likewise, Christianson wasn't hunting another '65 Corvette. Only his childhood dream Vette would work for him. He and Rory came up with a fair price based on the model year, options, and condition.

The '65 Vette was a good, restorable convertible, stored inside its entire life. There was no frame rot to deal with. Those small mechanical issues were easy for Christianson to fix. He even had his own shop and employees. "It does need a restoration, but for now I am restoring the mechanicals."

Christianson's long-term plan is to go after an NCRS Top Flight award. "I've always wanted to take one car and try to make it perfect. And this is going to be that car."

You might say Christianson is going to turn his dream car into a dream car. **VETTE**

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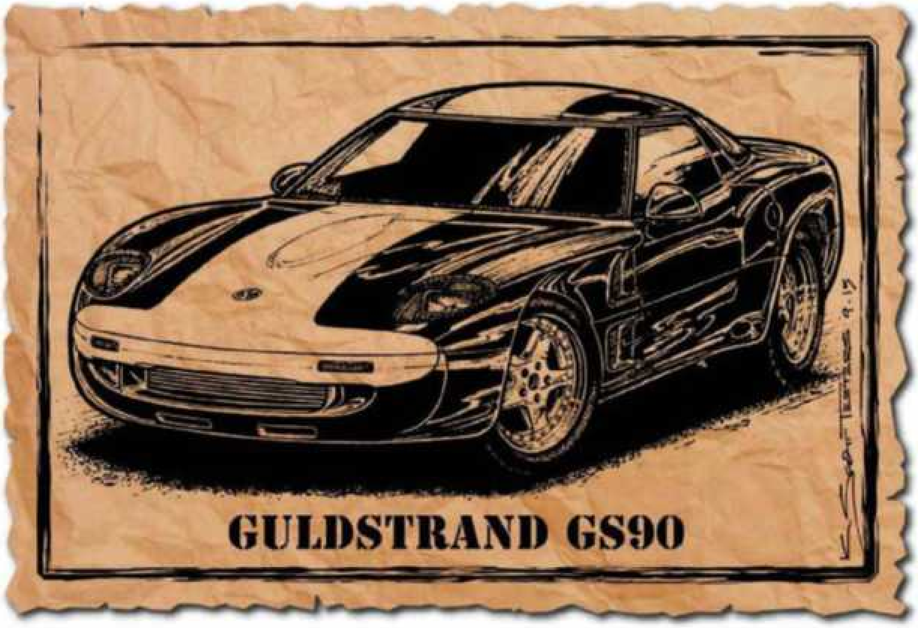

A BRIEF DICK "MR. CORVETTE" GULDSTRAND RETROSPECTIVE

ANOTHER CORVETTE LEGEND PASSES

On September 2, 2015, the Corvette community lost another legend; Dick Guldstrand passed – he was 87 years old. Dick was a member of the "old guard," one of Duntov's guys. He was part of the Southern California sports car racing scene that included Dave MacDonald, Mickey Thompson, Doug Hooper, Bob Bondurant, and others. Dick was a hot rodder in high school in a time when you were either a jock, a hot rodder, or a "candy-ass." Dick's ride was a '27 Ford on '32 Ford 'rails and he raced at El Mirage and Murdoc. When Dick went into the Army he was a USO singer and later got his degree in electrical engineering. The aerospace industry was hot in postwar Southern California and Dick landed a job as an electrical engineer, working with German rocket scientist Wernher Von Braun. This engineering perspective changed his approach to making cars go faster and it served him well.

In 1957, Dick bought a '56 Corvette and started racing his daily driver on the weekends. For the next few years, Dick used his engineering approach to get the most out of his Corvette and took advantage of Duntov's "racer kit" suspension parts. He had an intuitive skill for suspension setups that allowed his car to be driven harder and faster into turns. He used slightly warmed up stock engines for durability. By 1961, while Dick sold Chevys for H. E. Baher Chevrolet during the week, his employer sponsored his racing on the weekends. With his sponsorship support, Dick won the SCCA Pacific Coast Championships in 1963, 1964, and 1965. This kind of success gets you noticed by powerful people.

One day Dick got a call from Roger Penske with an offer to set up a pre-production '66 L88 Corvette and drive in the 1966 24 Hours of Daytona. He was flown to St. Louis to pick up the L88 Corvette fresh off the assembly line. The only problem was that the car wouldn't start. The workers pushed the car off the line and said, "This is yours, kid!" Dick got the car started, but it was January and the L88 had no heater. So the plant guys gave Dick a moving blanket to bundle up in for his 800-mile drive to Penske's shop outside of Philadelphia.

The L88's racing debut was spectacular. In the middle of the night, the car T-boned a slower car, blowing off most of the front of the body, but the car was still drivable. The team duct-taped bright flashlights to the tops of the fenders and Guldstrand simply followed the leading Ferrari. The team won 1st in class and placed 11th overall. Penske's sponsor Sunoco was so pleased they extended their sponsorship to cover the 12 Hours at Sebring race where the car won the GT class and placed 9th overall. Penske had recently purchased Grand Sport Roadster #001 and installed a preproduction L88 for the Sebring race. Guldstrand shared driving duty with Dr. Dick Thompson. The Grand Sport was a total beast, the fastest car on the straights. Four hours into the race, Thompson had a mishap with a slower Morgan, went off the track and was out of the race. While Guldstrand didn't get much time behind the wheel, his racing star was shining. He was hired to race at the 1966 Indy 500 but did not qualify.

1967 brought another opportunity for Guldstrand. Dana Chevrolet hired Dick, Don Yenko, and Bob Bondurant to drive a '67 427 L88 Corvette coupe in the 24 Hours of Le Mans. Racing is often peppered with last minute mistakes. When the car was packed for transport to France, they forgot to bring a trailer! So, Guldstrand had to drive the L88 race car 110 miles through the French countryside to the track. Word got out about a loud American race car being driven to Le Mans and crowds lined the roads see the American beast. Out on the track, the L88 set a new GT record of 171.5 mph on the Mulsanne Straight. The French had never seen anything like this before, making the Corvette the crowd favorite. Unfortunately, 13 hours into the race, the L88 threw a rod and was out. When Dick went back to Le Mans in 2005, he received a standing ovation from the spectators at the drivers' parade.

With this much experience, it was time to go into business. In 1968, Dick opened Guldstrand Engineering, in Culver City. Over the years, he worked for James Garner, Bruce Springsteen, Nicolas Cage, Arnold Schwarzenegger, and others. But it was his work for Garner's American International Racing (AIR) team that is most remembered by Corvette fans. Late in 1967, Garner hired Dick to prepare three new '68 L88 Corvettes for the 24 Hours of Daytona race. Guldstrand, Bob McDonald, and Perry Moore were flown to St. Louis to pick up the cars and drive them back to Dick's shop. On the track, two of the AIR Corvettes out-qualified the FIA competition

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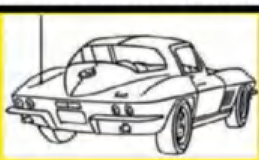

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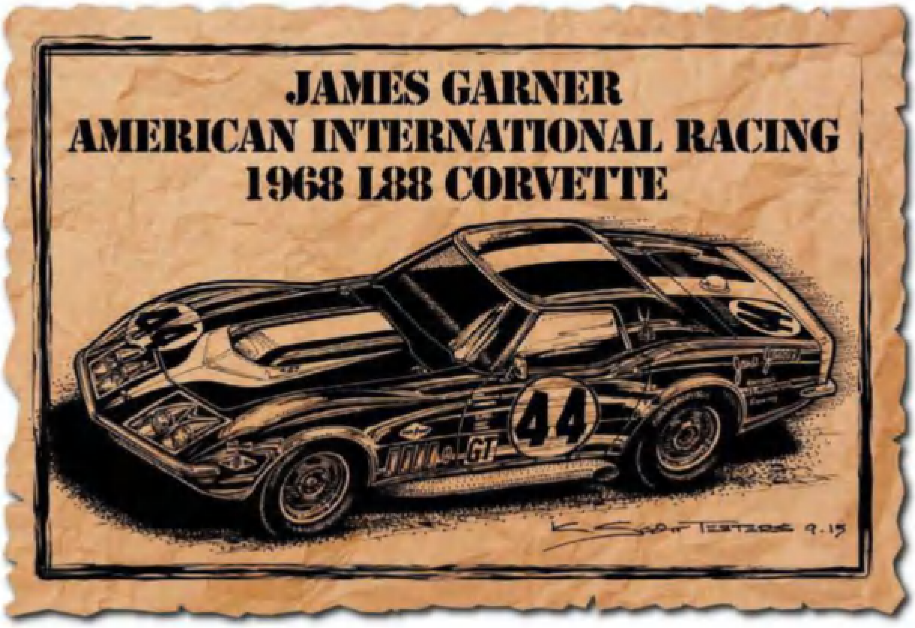

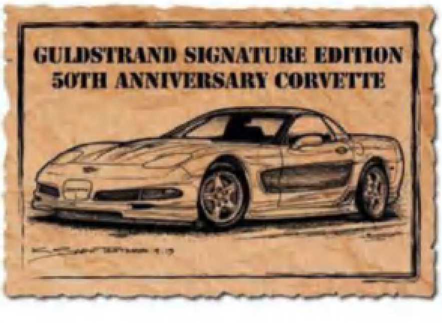

in their class and got front-row starting positions. But endurance racing is more than qualifying and the AIR Corvettes were not developed enough. A blown head gasket took out car #45, and car #44, driven by Guldstrand and Ed Leslie, went through four differential changes, finishing 29th. The AIR team moved on to racing Lolas and the L88 Corvettes were sold. In August 1999, Guldstrand had the opportunity to drive the fully restored #44 AIR Corvette at the Monterey Classics and again at the 2002 50th Anniversary event at Monterey. In 1969, Dick won the South American Trans-Am Championship in his '69 Z/28 Camaro, raced a Formula 2 Honda for a time, and NASCAR up to 1972. Into the 1970s, Guldstrand raced and did race car prep work for customers at his shop.

A major part of Dick Guldstrand's life was his three specialty cars: the GS80, GS90, and the Guldstrand Signature Edition 50th Anniversary Corvette. In retrospect, one wonders why he didn't start sooner. The 1986 GS80 cost $15,500 on top of the price of a stock Corvette and 19 to 25 cars were built. Suspension upgrades included: lowering, Heim joints replacing all rubber bushings, special toe-in and caster kits, Monroe GP shocks, Z51 rear spring, and a lower-than-stock front spring. The L98 engine was bored to 372 cid (later 383 cid), blueprinted by Traco, and produced around 375 hp. The interior had racing seats, five-point harness, shift light, oil temp gauge, and a dash-mounted tach. A removable 2-inch rollbar was included. Aside from the lower stance, black-lace wheels, and "Grand Sport 80" fender badge, the car looks a little tame. Some extra externals would have been cool.

Guldstrand's GS90 was a full body-kit makeover for the top-of-the-line ZR-1. The proposed full line of GS90 cars included a coupe, roadster, speedster, and lightweight models to be sold through Chevrolet dealers. Perhaps he figured that Chevrolet was working with Callaway, why not Guldstrand? Dick asked Chevrolet for 15 ZR-1s to get started; he got one and a "best of luck." The ZR-1's LT4 engine was worked-over by D.K. Motorsports and rated at 475 hp. The suspension got the full Guldstrand treatment. The problem with cars that are so extensively modified is cost. The GS90 conversion cost $134,000 on top of the $72,208 for the ZR-1, for a staggering grand total of $206,208! Only six GS90s were built.

More down-to-earth was the Guldstrand Signature Edition 50th Anniversary Corvette. Dick used his old formula: improved suspension and a warmed-up engine, only this special edition Corvette truly looked like an "extra-special" Corvette. Starting with the stock '03 Z06, the car got the Guldstrand suspension treatment plus a bored and stroked to "almost 427 cid" 500hp LS6 engine by Katech. Shouldn't a 50th anniversary car be "gold"? Dick thought so. Painted Anniversary Gold with Cobalt Blue side coves, and dressed with a chin-spoiler, side skirts, a mild rear lip spoiler, and a unique hood and gold Fikse wheels; this was one handsome Corvette – arguably, his best! A total of 50 cars were built, one for each year, signed and numbered by Guldstrand.

In 1999, Dick Guldstrand was inducted into the National Corvette Museum's Hall of Fame. Dick was not a shy or reserved man. He was bright and engaging, with stacks of wonderful racing stories. And just like his old USO singing days, he knew how to light up a room. He will definitely be missed. **VETTE**

K. Scott Teeters

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